

ARCHIVES OF OTOTOLOGY.

THE STACKE OPERATION FOR CARIES INVOLVING THE MIDDLE EAR¹ AS MODIFIED AND PRACTISED BY PROF. HERMANN SCHWARTZE, WITH AN HISTORICAL SKETCH, METHOD OF OPERATING, AND REPORT OF TWELVE CONSECUTIVE CASES.²

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(With ten figures in the text.)

HISTORICAL.—The anatomist Johannes Riolan, 1649, was the first to *propose* the operative opening of the mastoid for the relief of deafness and tinnitus when due to stenosis of the Eustachian tube. J. L. Petit († 1750) is quoted by von Tröltsch as being the first who *performed* the operation.

Jasser, a German military surgeon, performed the operation in 1776, upon a soldier, for the relief of suppuration and pain, and for a long time it was named "Jasser's Operation." This clouding of Petit's glory is perhaps explained by the fact that his operation was not published until 1774, twenty-four years after his death.

Jasser's report caused widespread interest, and the operation unfortunately came to be regarded *as a cure for deafness from any cause*. Naturally such abuse soon led to unfavorable results and the first death from the operation occurred in 1791. The victim was no less a personage than Baron

¹ Under the heading "Middle Ear" we include tympanum, attic, antrum, and mastoid cells.

² That part of this paper which relates to the report of cases, was read in the section on Laryngology and Otology of the American Medical Association at Milwaukee, June 7, 1893. An abstract of it will appear in the Journal.

Dr. von Berger, physician to the King of Denmark. Von Berger, then an old man, and suffering greatly from deafness, dizziness, and subjective noises, requested Professor Kölpin to perform the operation. Meningitis developed and death resulted on the twelfth day. The death of von Berger caused the operation to be almost universally abandoned for about seventy years. Even Sir William Wilde, who has been called the Father of Modern Otology, declared himself against the opening of the bone, although he introduced the periosteal incision that bears his name to-day.

In 1860 Forget¹ reported a case operated upon eleven years before, and at the same time, but independently, von Tröltsch in his *Anatomy of the Ear*, advocated the opening of the mastoid in cases where there was retention of pus, or diseased bone. He was especially successful in calling attention anew to the value of the operation, by an article published in *Virchow's Archives* in 1861, wherein he also reported a case of purulent otitis following scarlet fever, in which the perforating of the carious mastoid with a probe was sufficient to bring about rapid improvement.

Turnbull, in 1861, reported a successful case,—the first in this country.

In 1863 Schwartz reported one case where, after a Wilde incision and evacuation of pus, the diseased bone was perforated.

In most of these cases there had been no sharp instruments used to open the bone directly, but the fistulous openings in the diseased and softened bone were generally enlarged by the aid of blunt probes and the cavities syringed. But we now begin to find records of cases where drills and other cutting instruments were used.

The reports of operated cases from this time on became more frequent—Triquet² in 1864; L. Jacoby³ and Pagenstecker⁴ reported several cases in 1868; Kessel⁵ in 1869,

¹ *L'Union Méd.*, No. 32.

² *Gaz. des Hôp.*, 1864.

³ *Archiv für Ohrenheilkunde*, vol. iv. *

⁴ *Ibid.*, vol. i.

⁵ *Ibid.*, vol. iv.

three cases; Schwartz¹ and Koppe in the same year reported two cases of reflex epilepsy with caries of the temporal bone,—cured by an operation; Roosa² and Agnew³ in 1870; and A. H. Buck⁴ in 1871. In 1872 D. R. Ambrose reported one case, and from Professor Volkmann's clinic five cases were reported by Shede.

Up to this time the results of the operation were far from satisfactory, and the old deeply-rooted opposition was encountered on every side by the few who had the courage to undertake it. Nor had there been any thorough study made of the great variation in structure of the temporal bone, and the resulting danger the surgeon must encounter when operating. The technique of the operation was also far from being perfect. To remedy this, Schwartz and Eysell made an exhaustive study of the temporal bone in health and disease, and the results of their investigations were published in 1873. This publication contained a history of the operation up to that time, also chapters on anatomy, physiology, pathology, and the indications for the operation and manner of performing the same. They also strongly advocated the *mallet and chisels* in preference to the drill or trephine. The article ended with a report of seventeen cases operated upon by Schwartz. This work was so thorough and convincing that the operation gained many supporters, and it gradually ceased to be regarded as a procedure permissible only as a last resort in rare instances, and began to rank as an invaluable addition to existing therapeutics.

The rules or indications for the operation which Schwartz formulated in his early works have been universally accepted as authoritative. The slight changes they have undergone are the outgrowth of advances in surgery, and a more intimate knowledge based upon experience and study. A translation of the rules, as found in his last publication,⁵ is given below :

“ 1. In acute primary and secondary inflammation of the

¹ *Ibid.*, vol. v., 1869.

² *Med. Record*, July, 1870.

³ *Transactions of the American Otological Society*.

⁴ *Med. Record*, 1871.

⁵ *Handbuch der Ohrenheilkunde*, 1893.

mastoid, when after the use of antiphlogistic remedies (especially ice applications) the pain, swelling, and fever does not subside in a few days—eight days at most.

“2. In chronic inflammation of the mastoid, with recurrent swelling, or with existing abscess formations and superficial fistulæ, with gravitating abscesses along the side or towards the nape of the neck, in the external canal or towards the pharynx; even if there are no life-threatening symptoms.

“3. In chronic purulent inflammation of the middle ear without any external evidence of inflammation of the mastoid, when there is any probability of symptoms developing that might cause dangerous complications as a result of pus retention or cholesteatoma formation.

“4. In otherwise incurable neuralgia of the mastoid.

“5. As a prophylactic operation against fatal results developing from fœtid middle-ear discharge without any visible inflammation of the mastoid, and without signs of pus retention (pain, fever) whenever after a careful examination it is proven that the seat of the purulent secretion is not limited to the tympanum.”

Up to 1873 the operation had been performed only when the inflammation (acute or chronic) assumed such proportions as to threaten life.

At this time, as a result of the more careful study of the pathological changes of the ear, a new operation developed, *i. e.*, *excision of the ossicles* through the normal external canal. In 1873 Schwartze was probably the first to remove the *membrana tympani* and hammer. Kessel removed both hammer and anvil about the same time. This operation did not attract much attention until within the last few years, and its value and scope are still to be determined. The following indications for the operation are given by Schwartze.¹

“The excision of the hammer and anvil is indicated:

“(a) As a cure for chronic purulent discharges from the attic without taking the still existing hearing capacity into consideration,

¹ *Handbuch der Ohrenheilkunde*, Band ii., p. 768.

"1. In caries of the hammer and anvil.

"2. In chronic purulent discharge in the tympanic cavity without positive signs of caries of the hammer and anvil ;

"3. In cholesteatoma in the tympanic cavity ;

"(b) For the improvement of hearing and the cure of subjective noises,

"1. When there is fixation of the hammer on account of total calcification of the ear-drum, anchylosis of the hammer-anvil articulation, or synechiæ of the membrana tympani with the promontory, if by a trial incision in the membrana tympani, with resulting improvement of hearing, deep-seated obstructions in the path of the sound-waves to the window of the labyrinth, such as synostosis of the stirrup, and labyrinth affections, such as nerve deafness, can be excluded through exact qualitative hearing tests. Ability to hear the voice must still exist,

"2. In incurable obstruction of the Eustachian tube. When by a trial puncture of the retracted drum membrane a substantial, though temporary, improvement in hearing results, with accompanying replacement of the drum membrane (?) (See below) ;

"3. In sclerosis of the tympanic cavity with no sign of nerve deafness, when each catheterization is followed by an objective, measurable, but quickly vanishing improvement in hearing, and diminishing of the noises in the ear, and the same result is gained by a trial puncture of the ear-drum (?) (See below)."

It will be noticed that Schwartze has placed an interrogation mark after indication 2 and 3, under heading *b*. The reason for this is explained in the following translation from his recent work :¹

"The chances are more unfavorable when the excision is made where stenosis of the Eustachian tube exists, as the result, although very satisfactory, is only temporary, and the good effect disappears entirely again with the reproduction of the ear-drum. This comparatively rare indication will only be sustained in the future if a sure preventive of the reproduction of the ear-drum is found.

¹ *Handbuch der Ohrenheilkunde*, Band ii., p. 782.

"After the above experiences the indication (for excision, A—¶ 3 above) in the pathological changes, designated by the name of sclerosis of the tympanum (dry catarrh), must be declared as very doubtful. At any rate, cases selected in the future, according to this indication, for trial operations, should be limited to those in which the deafness has not reached such a very high stage that only loud words spoken into the ear can be understood, and in which case it has been positively proven that the hearing after catheterization has been definitely, if only temporarily, improved, or if a very noticeable effect has been gained by a trial incision of the ear-drum. For thereby is demonstrated the non-existence of ankylosis of the stirrup, which has anatomically been proven to be the most frequent termination of sclerosis."

In 1891 Stacke, a former assistant of Schwartze, published a new method of operating in chronic inflammations of the middle ear, whether existing with or without inflammation of the mastoid, or cerebral irritations. This operation is so rational that it seems remarkable no one should have thought of it before. It aims to *remove all diseased tissue found in the middle ear*, and, to accomplish this, one or all of the cavities are opened. Stacke operates from within the osseous canal, enlarging in the direction desired by removing consecutive layers of bone, until the cavities are exposed, and all diseased tissue removed. To guard against cicatricial contraction of the meatus, and to transplant healthy epithelium to the denuded cavity, he devised the very successful method of preparing flaps from the membranous canal.

I have seen the Stacke operation performed, and have also tried it, but greatly prefer the method as perfected and practiced by Schwartze.

I give below a list of *instruments*, with *accessories* and *preparations* necessary for the operation.

A good light is required—daylight preferred—but in emergency the electric forehead mirror, as made by Leiter and others, now frequently used in examinations, has served me as an excellent substitute.

Instruments.—One ear speculum and forehead mirror for inspecting the parts before operating; one metal ear syringe; a razor; one scalpel; one dozen hæmostatic forceps; a blunt-pointed periosteum scraper; one blunt four-pronged retractor, 18 mm wide; two Stacke knives, right and left, for cutting membranous canal; a wooden mallet; six assorted chisels, 11 cm long, and the cutting edge with rounded corners from 2 to 10 mm broad; one Stacke chisel (curved handle); two bone curettes with oval cups, one 13 by 6 mm, the other smaller, also one with angular handle and cup 2½ mm broad; two flexible probes; one paracentesis needle; a blunt-pointed knife for cutting drum membrane; right and left tenotomes and a Wilde snare; two pair of angular ear forceps, one with teeth, the other smooth, for removing splinters of bone and holding cotton or gauze pledgets; needles, catgut, and silk.

For convenience and thoroughness I have found nothing equal to the steam sterilizing apparatus,¹ as recommended by Schimmelbusch.² All coats, towels, gauze, cotton, bandages, etc., must be packed loosely in the perforated cans, which are placed within the large steam cylinder, and should remain three quarters of an hour after the thermometer registers 100° C., when they may be removed. The advantage of these cans is that they can be tightly closed and readily carried to the place of the operation, thus guarding against re-infection.

All of the instruments must be boiled from five to ten minutes in 1 per cent. soda solution. The soda is added to protect the instruments from tarnishing, and it increases the disinfecting powers of the boiling water.

The hands and forearms of the surgeon and assistants must be made as aseptic as is possible by the free use of hot water, soap, and a stiff brush, followed by a rubbing with gauze saturated with ether, and, lastly, washed in a solution of 1:1000 bichloride.

The Operation.—The patient should be bathed and furnished with a complete change of linen; special attention

¹ Manufactured by M. Lautenschläger, Berlin.

² Schimmelbusch, *Aseptische Wundbehandlung*, 1892.

must be given to the thorough cleansing of the head by the free use of soap and water. All the scalp within a radius of four inches of the ear must be shaven; if the parts are tender and patient very nervous, this may be deferred until after anæsthesia. The ear is thoroughly syringed to cleanse the canal of offensive secretions, and the convolutions and parts shaven disinfected by the free use of soap and water, ether, and 1:1000 bichloride. The scalp should be enveloped in a towel wrung out of a bichloride solution and securely fastened.

The ear is pulled gently forward and the incision begun 1 *cm* above the insertion of the auricle, and carried downwards 1 *cm* behind and parallel to the insertion of the auricle, to the apex of the mastoid. The tissues are divided to the bone by a few and as cleanly-made strokes as possible.

In rare cases when, on account of swelling of the soft parts or extensive disease of the bone, more room is wanted, make a free incision backwards at right angles (see Fig. 9).

Ligate bleeding vessels with catgut or use torsion, and stop capillary bleeding with hot water.

Denude bone with raspatory, backwards, so as to expose mastoid, and forwards into external osseous canal to a point where lining becomes membranous. Then with a Stacke knife cut through the soft parts and we now have the whole of lining of canal protruding from detached auricle like a funnel. To hold this out of the way a long angular retractor is in general use, but it frequently slips, is tiresome, and requires the entire hand of an assistant. In its place I use a loop¹ (see Fig. 1) about five inches long, which the assistant can hook with the ring and little fingers and draw the ear forward. With the other fingers of the same hand he can hold such artery forceps as are needed to control venous and capillary oozing.

The posterior lip is drawn backwards by the retractor (see Fig. 1), and we can now inspect the mastoid for path-

¹ This picture, taken from a cadaver, shows the opening as it appears after the bridge of bone has been removed and the cavities united into one. I must apologize for the incorrect position of the assistant's hands, absence of the artery forceps, and of the towel which should envelop the head, and excuse these errors on the ground of lack of accommodation and time.

ological changes, and the membrana tympani is placed within easy access and full view, by direct light.

If the cortex of the mastoid is diseased, we follow up the affected parts by the aid of curette and chisel; but should the bone be healthy, then we must look for our landmarks (see Fig. 2). Of these there are two, the *linea temporalis*, a horizontal ridge formed by the extension backwards of the zygomatic process (Fig. 2, 17); it is nearly always present

FIG. 1.



View showing the parts as they appear when the operation upon the bone is finished, and we are ready to replace the soft parts; also indicating position of retractor and loop.

and can be felt through the normal integuments. This line, in about eighty per cent. of cases, lies lower than the middle cerebral fossa,¹ and in the remainder, either on a level with it or higher, for which reason we must never carry our operation above this line. The other landmark is the *spina supra*

¹ On 120 skulls examined, Schülzke found the lower edge of the linea temporalis below the middle cerebral fossa in 82.5 per cent., in $3\frac{1}{8}$ per cent. at the same level, in 10 $\frac{5}{8}$ per cent. higher, and in $3\frac{1}{8}$ per cent. not measurable.

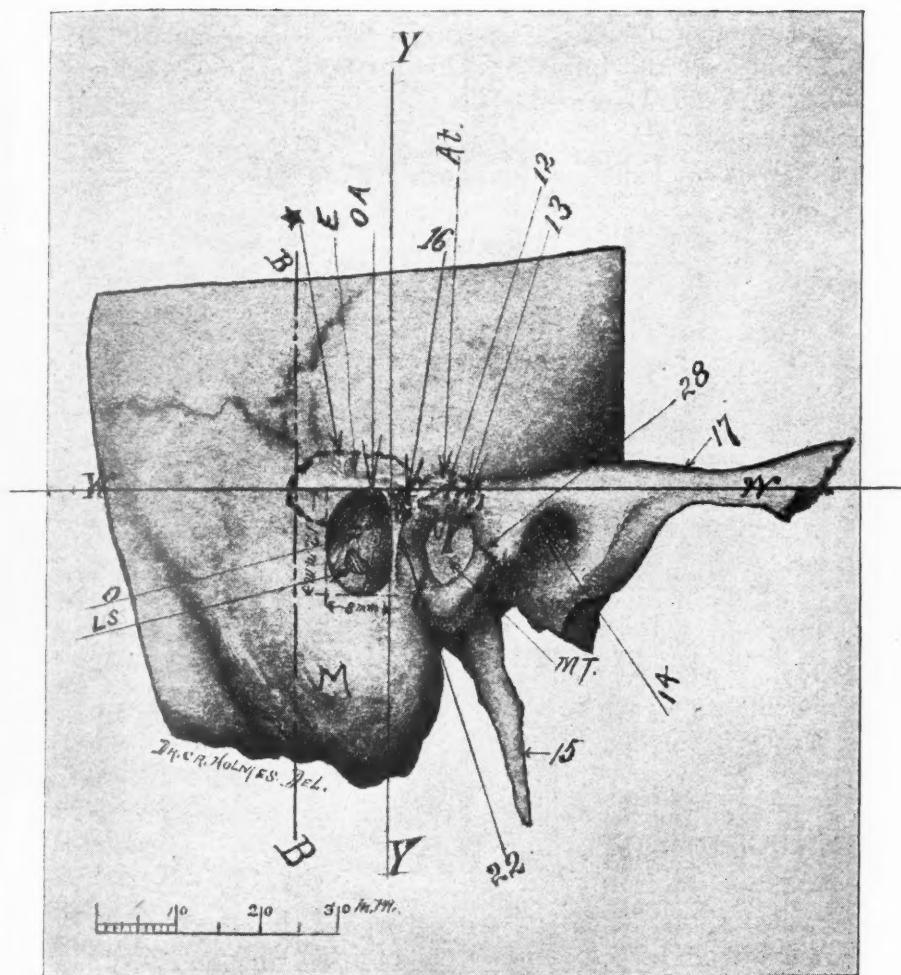
meatum (Fig. 2, 16). Bezold found after numerous measurements that the spine is higher than the floor of the antrum. Kisselbach and Schülzke found it present in about eighty per cent. of cases. Should neither of the landmarks exist, we can readily determine our starting-point by drawing horizontal and perpendicular lines tangent to the external meatus (Fig. 2, *Y Y*, and *W W*). The line *W W* corresponds to the lower edge of the linea temporalis, and also touches the upper edge of the meatus; line *Y Y*, is erected at right angles to this, touching the posterior margins of *spina* and external meatus.

We now construct our irregular oval (Fig. 2, *C*) 12 *mm* perpendicularly and 8 *mm* horizontally, which forms the base of a cone, the apex of which lies in the antrum.

With the largest chisel we begin to remove the bone as outlined, convert the cone into a funnel-shaped opening, the general direction of which should be inwards and slightly forwards, almost parallel with the posterior wall of the meatus, leaving the bridge of bone between the funnel and external meatus, about 1 *mm* externally and 4 *mm* near the membrana tympani. The upper surface of the funnel I give only a very slight downward incline, which is enough to guard against injuring the dura; while the posterior and lower walls are given a decided forward and upward slant, because by so doing we are less liable to wound, even if we should expose, the lateral sinus. If encountered at all it will generally be at or near the place indicated by *L S*, Fig. 2. But we may find it anywhere along the posterior wall. The great variation in the position of the lateral sinus is well shown in Figs. 3 and 4, where there is a difference of 16 *mm*. When working in this neighborhood the chisel should be large and held very obliquely, and the bone removed in very thin shavings; with these precautions there is but little danger. To demonstrate this I have repeatedly exposed the sinus upon the cadaver without wounding it (also see Case 4).

Cases of injury to the sinus have been reported by Knapp, Schwartz, Jacoby, and others. Judging by the small percentage of fatalities among cases where this accident has

FIG. 2.—SIDE VIEW OF TEMPORAL BONE.



W W, and *Y Y*, lines indicating the horizontal and perpendicular planes of the skull; *O*, opening in mastoid leading to antrum; *OA*, opening into antrum; *LS*, shows where lateral sinus is generally encountered if displaced far forwards; *M*, mastoid process; *22*, wedge formed by posterior wall of external meatus and opening in mastoid; *15*, styloid process; *MT*, memb. tymp.; *14*, glenoid cavity; *28*, Glaserian fissure; *17*, zygomatic process; *12* and *13*, outlines showing position of hammer and anvil and location of attic; *16*, *spina supra meatum*; *, dotted lines showing position of antrum, varying much in different subjects; *E*, linea temporalis.

occurred, the injury *per se* is not as dangerous as was formerly supposed,—due perhaps to the non-infection of the wound under modern asepsis.

I once saw this injury in Schwartz's clinic; the bleeding is very profuse, but readily controlled by iodoform tampons, and the operation is, of course, brought to an abrupt termination. The patient must be kept quiet for several days, and in about two weeks the operation can be completed.

After penetrating the cortex, some of the upper cells leading to the mastoid process are generally opened, which gives us an opportunity to judge of the presence or absence of disease in this part. If diseased, we chisel away the cortex from over the area affected—if need be the whole plate—and with a sharp spoon remove affected parts. Should we find the cells normal, we proceed to complete our tunnel, keeping steadily along the posterior wall of the external meatus and exchanging the broad for the narrower chisels.

The depth at which we encounter the irregularly-shaped cavity called the antrum¹ varies greatly (*, Figs. 2 and 6). This is explained by the variation of size found in health, which is aggravated by pathological changes; the bone may *decrease* in thickness on account of cholesteatomatous formations and caries, or it may *increase*, *i. e.*, osteosclerosis result as a condition secondary to long-existing suppurations. After entering the pneumatic cells, an olive-pointed probe should be frequently introduced to determine when we have reached the antrum. The average depth at which this occurs in adults is, according to Bezold, 6 mm, according to Schwartz, 12 to 18 mm,—a bewildering discrepancy, which can only be explained by the great variation in the mastoid, as mentioned above. It shows, however, how important it is that all writers should take their measurements from *one point*, and the most constant and least liable to variation from disease is the *spina supra meatum* (Fig. 2, 16).

Schwartz in his recent work (vol. ii., p. 804) states that in exceptional cases the chisel may “already” reach the

¹ The average size, as given by Professor Bezold, is length 12.7 mm; height, 8.5 mm; and greatest width, 6.7 mm.

FIG. 3.

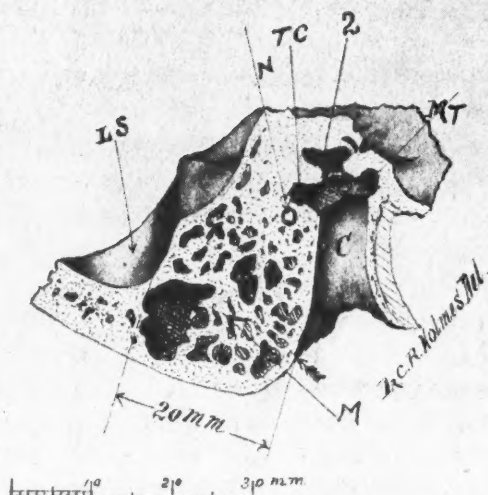


FIG. 4.

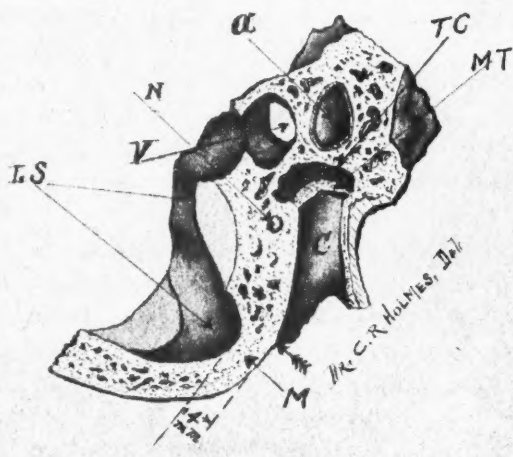


FIG. 3.—Horizontal section through right temporal bone, showing distance between lateral sinus and external canal. Cut begins below centre of external canal, passing obliquely upwards and inwards.

LS, lateral sinus; *M*, mastoid; *N*, facial nerve; *TC*, tympanic cavity; *2*, vestibule; *MT*, memb. tymp.; *C*, external canal; small arrow indicates the point where a perpendicular line from the *spina supra meatum* would touch.

FIG. 4.—Horizontal section through right temporal bone, cut near centre of external meatus, showing how close lateral sinus may come to external canal in some cases.

a, internal carotid artery; *V*, internal jugular vein. For explanation of other letters, see Fig. 3.

facial canal at a depth of 18 *mm*; at a depth of 20 *mm* we should exercise the greatest precaution; and we should never go beyond 25 *mm*.

That such measurements have not been taken from the spina, but from the changeable prominent portion of the mastoid, as is indicated by dotted lines (Fig. 5, 23), and hence are *valueless*, is easily proven by examining Fig. 5,¹ where the position of the spina is indicated by an arrow; this point in our section is the outer edge of the wedge of bone (22) which is left between the posterior wall of canal (C) and our funnel-shaped opening.

The distances (which vary only slightly in different specimens when cut through the same plane as Fig. 5) from the spina to the parts likely to be injured, are as follows:

From spina to facial nerve	15 <i>mm</i> .
“ “ horizontal semicircular canal	16 <i>mm</i> .
“ “ posterior “ “	18 <i>mm</i> .
“ “ foot plate of stapes	22 <i>mm</i> .
“ “ end of short process of anvil	16 <i>mm</i> .

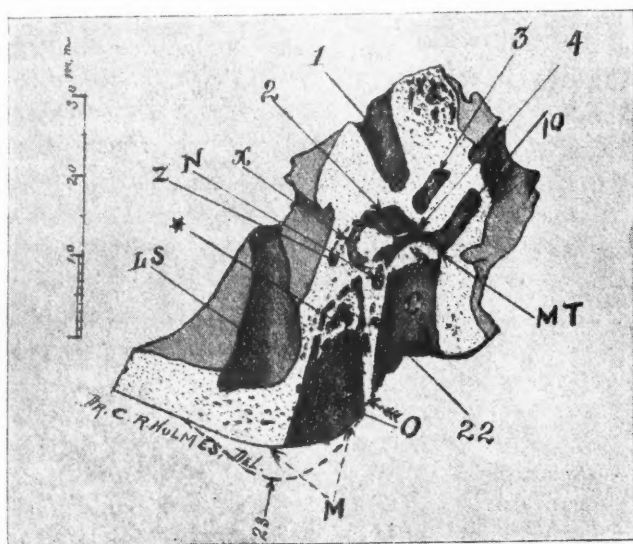
It will be seen from these measurements that 20 *mm* from the spina would carry us into the labyrinth, and 25 *mm* beyond it. *And it may be accepted as a general rule that the only safe guide to the extreme distance which we may penetrate is the distance from the spina to the posterior superior margin of the drum membrane, which, in health, fluctuates but little from 15 mm.*

The direction of our canal should be such that the wedge of bone (Figs. 2 and 5, 22) should be 4 or 5 *mm* thick at the memb. tymp., and the floor inclined upwards, as shown by the dotted lines (Fig. 6, O), opening into the neck of the antrum, and close to the extremity of the processus brevis of the anvil. (See position of anvil and artificial opening into antrum, partly occupied by end of arrow—Fig. 6.)

¹ During the preparation of this article I dissected carefully 15 temporal bones, and selected for the illustrations such as would best demonstrate the points I desired to explain. The drawings were prepared after numerous careful measurements, and are exact full-sized reproductions of the specimens.

We are not often compelled to carry the opening so deep, and it will be noticed in Fig. 6 that the antrum (*) passes outwards and backwards from the attic, anterior to an antero-posterior line, touching the memb. tymp., frequently coming within a few *mm* of the surface, and were it not for the danger of encountering the lateral sinus, we could, in

FIG. 5.



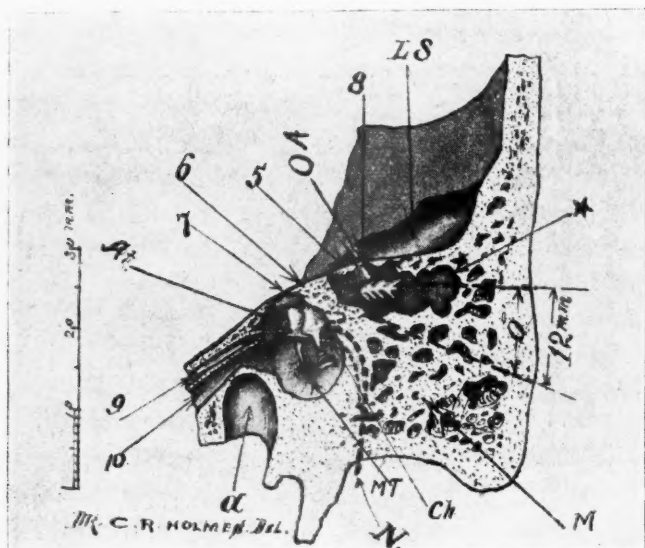
Horizontal section through right temporal bone, cut 2 *mm* above centre of external canal. *O*, opening in mastoid leading to antrum; the heavily dotted lines indicate the depth to which the opening penetrated in the upper section of this bone; small arrow indicates relative position of *spina*; 22, wedge between opening in mastoid and external meatus; *M*, mastoid; 23, dotted lines indicating how osteosclerosis may increase the depth to which it is necessary to penetrate; *C*, external canal; *, large cell in direct communication with the floor of antrum above; *LS*, lateral sinus; *Z*, posterior semicircular canal; *N*, facial nerve; *X*, horizontal semicircular canal; 2, vestibule; 1, internal canal; 3, cochlea; 4, fenestra ovalis; 10, Eustachian canal; *MT*, memb. tymp.

most cases, reach it much more quickly by directing our opening inward, backward, and upward, instead of inward slightly forward, and upward.

Having opened the antrum, we can, with a small probe, bent at an obtuse angle of about 7 *mm* from the point,

enter the *attic*,¹ the probe generally passing over the short process, and behind the body of anvil and head of hammer (Fig. 2, 12-13) in the direction indicated by, but lower than the head of arrow (Fig. 6).

FIG. 6.



Perpendicular section through right temporal bone, beginning at line *BB*, behind opening *O*, in mastoid (see Fig. 2), and directed inwards and forwards, cutting Eustachian tube in its long axis.

N, dotted lines show the course of facial and chorda tympani nerves; *M*, mastoid; *Ch.*, chorda tympani nerve; *MT*, memb. tymp.; *A*, canal for internal carotid; *10*, Eustachian tube; *9*, processus cochleariformis; *At*, Attic; *7* and *8*, showing defects in the bone covering attic and antrum; *OA*, opening into antrum (see Fig. 2); *LS*, lateral sinus; *, antrum; *O*, dotted lines indicating funnel-shaped opening (see *O*, Fig. 2).

If the attic is roomy the probe may be passed across it into the tympanic cavity.

(In *acute* cases where it is *not desired* to remove the ossi-

¹ The *attic* is that space located above the tympanum, within which are contained the body and short process of the anvil, and the head and neck of the hammer. The floor of this cavity is about indicated by the course of the chorda tympani nerve (Fig. 6, *Ch*). This cavity has received various names: (1) atticus, (2) upper tympanic cavity, (3) recessus epitympanicus, (4) aditus ad antrum, the latter being frequently contracted to (5) aditus.

Bezold gives the average size of this irregular space as follows: Length, 4.2; height, 5.7; and greatest width, 6.6 mm.

cles, it is well to remember that a stiff probe roughly pushed into the attic may dislocate them, as I have demonstrated on the cadaver.)

The probe which has been passed into the attic is left as a guide, the extremity being bent backward towards the occiput, and held by an assistant.

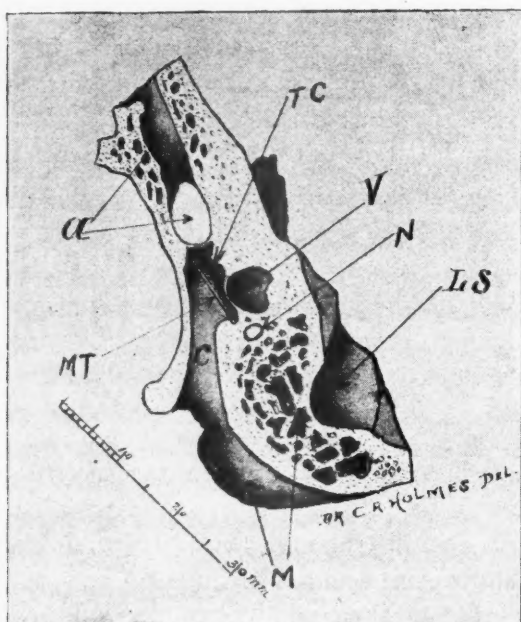
We now begin to cut away the wedge (Figs. 2 and 5, 22), exerting great precaution when removing the last portion, which forms part of the outer wall and floor of the attic, including a segment of the annulus tympanicus, as it generally gives way very suddenly, and the chisel might plunge across the cavity and injure the facial canal or the stapes. It is also safer to use one of the broader chisels, this being less liable to slip than a narrow one.

The anvil is now exposed, disarticulated from the stirrup with a Schwartze tenotome, and removed with a pair of forceps. I have removed the anvil several times without cutting the articulation, which parted readily, not disturbing the stapes. I should not, however, recommend it as a routine practice. While in many instances the long process is necrosed, and there is no articulation, in others it is unimpaired or firmer than normal on account of inflammatory changes; and the accidental removal of the stirrup, which although it has frequently occurred, even in suppurative cases, without any ill effects beyond greater impairment of hearing, is unpleasant and not clean surgery.

We next detach the memb. tymp. from the annulus tympanicus with the membrane knife, and then remove the hammer. The upper part of the osseous canal (pars ossea) is cut away until a bent probe passed to the roof of attic and drawn outwards fails to meet any obstruction. The antrum, attic, tympanum, and external meatus are now united into one large cavity, all parts of which can be freely inspected, even to the entrance to the Eustachian tube (Fig. 6, 10). We next endeavor to remove diseased tissue wherever found, by chisels and curettes. We may find carious bone in any of the cavities, which if possible must be removed, even if we are compelled to freely expose the dura or lateral sinus; but we should never be aggressive unless we have the hidden

anatomical relations of the parts *clearly* before our mind's eye. In the tympanic cavity proper we must at all times exercise the utmost care in the use of curettes; the reason for this will be self-evident if we glance at Fig. 7, where the anterior and a part of the medial walls are composed of bone, in places not thicker than two sheets of the paper on which this article is printed. We should also be on our

FIG. 7.



Horizontal Section of Temporal Bone Cut Near Floor of External Meatus, *A*, canal for internal carotid; *TC*, tympanic cavity; *MT*, membr. tymp.; *V*, bulbus of internal jugular vein; *N*, facial nerve; *LS*, lateral sinus; *M*, mastoid.

guard against injuring the facial nerve which at times has scarcely any bony covering. In using the curette in the attic, it is also well to remember that often the tegmen tympani is exceedingly thin, and even cribriform, as shown at 7 and 8, Fig. 6.

Anteriorly we could readily wound the internal carotid, for while in most cases there is a firm wall, as shown in Fig.

4, between tympanum (*TC*) and internal carotid (*A*) and the bulb of the internal jugular vein (*V*), we never know whether or not we are operating on a case where the walls are as thin or even thinner than in Fig. 7. Friedlowsky and Zuckerkandl¹ found cases where the walls were *cribriform* or *entirely absent*. The bulb of the internal jugular vein (which is cut at *V*, Fig. 7) is formed by the coalescence of the lateral and inferior petrosal sinuses. The size of the jugular bulb or sinus varies much—if large it may form the floor and medial wall of tympanum; the bone is then either very thin, as in Fig. 7, or entirely absent. Müller² found in 100 specimens examined, the wall transparent in 15, and defective in 13. Cases of fatal bleeding from the jugular are also quoted by Hessler.

All sharp ridges, corners, and spiculæ of bone, both within the cavity and around the outer margins, must be rounded off.

Where the wedge (Figs. 2 and 5, 22) was removed there still remains a ridge between the external canal (Fig. 5, *C*) and antrum (Fig. 5, *), which increases in height as it approaches the middle ear. We can with safety obliterate this ridge up to within 10 *mm* of the annulus tympanicus, measured along the lower and posterior portion of canal; beyond this part (medialwards) we encounter a dense, rounded ridge of bone curving forward over the oval window, and forming a part of the floor of the attic. This ridge, throughout its course, encloses the facial nerve, and within the part curving over the window is also harbored the horizontal semicircular canal, which must, of course, not be injured.

Concerning this Stacke³ says:

"It is essential that the communication between the antrum and external canal be as broad as possible, for reasons which the after-treatment has proven. So much of the pos-

¹ Hessler, "Die letalen Folgeerkrankungen bei Ohr affectionen," *Handbuch der Ohrenheilkunde*, Band II.

² Hessler, "Die letalen Folgeerkrankungen bei Ohr affectionen," *Handbuch der Ohrenheilkunde*, Band II.

³ "Weitere Mittheilungen über die operative Freilegung der Mittelohrräume nach Ablösung der Ohrmuschel," *Berliner klin. Wochenschrift*, 1892, No. 4.

terior wall of the external canal can be removed laterally, that the lower wall of the external canal can pass uninterruptedly into the lower wall of the attic. Deep in, however, there still remains below a ridge between canal and antrum; and on a level with the aditus the width of the cleft is regulated by this ridge of bone. Should we *at this point* attempt to *widen the attic downward*, [italics are mine] injury of the facial would be unavoidable."

Schwartz, in his latest work,¹ repeatedly calls attention to the liability to wound the facial nerve and says:

"During the earlier months in which we operated according to this method there occurred six cases of transitory facial paralysis, later none. The nearer we come to the antrum in chiselling away the wall of the posterior canal, the more careful we must naturally be. At any rate, it is possible to wound the nerve without having touched the medial wall of the exposed cavities, even farther laterally in the descending portion of the Fallopian canal in the mastoid proper. Here one may come upon very marked individual variations of the course, and we have come into collision with the canal where under normal conditions we should not suspect finding it."

From these statements it is evident that much care should be exercised to guard against wounding the facial canal.

In the very excellently compiled little work entitled *The Mastoid Operation*, by S. E. Allen, the author ventures a criticism of Stacke, which gives the impression that Stacke's precautions when approaching the facial canal are too exacting.

Allen states:

"We are thus enabled, although contrary to what Stacke says, to remove a considerable portion of this ridge medially, and can render the opening between antrum and meatus almost as free as we can more laterally.

"The essential point in the operation is to make the antrum and attic accessible from the meatus, and therefore it is of the greatest importance to cut down the ridge as much as possible."

¹ *Handbuch der Ohrenheilkunde*, Band II., S. 825, 1893.

By referring back to the translation of Stacke, it will be seen that he virtually advises what Allen attempts to criticise, so far as removing the ridge between external canal and antrum is concerned. What Stacke specially wishes to emphasize is where he says: "Should we at this point attempt to *widen the attic downwards*, [italics mine] injury of the facial would be unavoidable." In other words, it would be dangerous at this point to attempt to widen the passage by chiselling away a portion of the aquæductus Fallopii, a statement so self-evident that dispute is out of the question. Besides, I see no occasion for running risks of injuring such important parts, for I have not found any difficulty in obtaining sufficient room for inspection and treatment of antrum and attic, when all of the posterior and a portion of upper wall of external canal (pars ossea) has been removed.¹

The only nerve that is unavoidably injured is the chorda tympani, but with no consequential results excepting temporary inability to taste on the corresponding side.

The operation upon the cavities being finished we proceed to cover the denuded bone as far as possible with two flaps formed from the funnel-shaped lining of external canal, in the following manner: The funnel is split on its upper posterior surface, in the direction of its axis, up to the concha, where another incision is made at right angles, cutting through one half of the diameter of the funnel; this forms two flaps, which are turned back over the denuded bone. To help hold them in position we insert catgut sutures into the edge of each flap and sew it into the upper and lower margins of the wound. The object of the flaps is to guard against cicatricial contraction of the meatus, and also to bring healthy epithelium into the middle ear. Especially do we hope much from this in cholesteatoma, because the healthy epithelium from the implanted flaps spreads very rapidly and covers the whole cavity if the granulations are properly controlled, and no diseased tissue is left behind.

In cases where there has been much discharge I syringe

¹ If the drawing of Plate VI. (Allen's book) is correct he has removed even less of the ridge between antrum and external canal than Stacke recommends.

the parts with a hot neutral salt solution ; in others I only cleanse the cavity thoroughly with pledgets of gauze or cotton.

When the disease is limited to the ossicles and mucous membrane I generally close the posterior wound entirely with silk sutures (see Fig. 8).

FIG. 8.



Showing appearance after removal of first dressing in cases where the wound was closed entirely after the operation. Irregularities along line of union caused by suppuration and scar following a former mastoid operation (see Case 12).

I have not as yet determined to my own satisfaction where to draw the line as to the cases in which it is best to sew up the wound at the time of the operation and pack the cavity through the external canal or only close

the upper and lower part of the incision (see Fig. 9) and pack, both through the posterior opening and external canal; the latter must not be neglected to guard against constriction of meatus.

FIG. 9.



Case 12, showing appearance after removal of first dressing in cases where the wound is left open after the operation. The white elevation on anterior lower margin of opening is a wad of cotton passed through external canal.

I use iodoform gauze for packing, and so far have not encountered any of the unpleasant symptoms, such as nausea, vomiting, and eczema, of which Schwartz speaks in his latest publication.

The ear is covered with gauze or cotton, and carefully

bandaged, and the patient is kept quiet for three days, when the first dressing is removed.

The opening behind the ear is generally permitted to close between the fourth and sixth weeks, when the appearance generally is as in Fig 10, unless there has been extensive loss of bone from caries.

Fig. 10.



Showing appearance of a case after the parts have been permitted to close.

REPORT OF CASES.

In preparing this paper I have excluded all of my operative cases on the ear where the ossicles were not removed, nor have I included any of the cases upon which I operated while in Professor Schwartze's Clinic in Halle. This operation is still new, and the number of reported cases is not sufficiently large to render additional reports valueless.

How long a time must elapse after the patient is discharged, before we are justified in claiming that a cure has been effected, must naturally vary according to the character and extent of the pathological changes found. By the ordinary extraction of the ossicles through the external canal, without opening directly into the adjacent cavities, various operators maintain that from six months to one year must elapse before one can lay claim to a cure. Schwartz, whose opinions on matters relating to operations on the ear we must acknowledge as far outweighing the views of any other individual authority, claims that two years must elapse from the time the patient is discharged before we can pronounce a cure. He also states that in mastoid cases operated upon by himself from twelve to thirty years ago, the disease returned in some cases from three to eight years after they had been discharged as cured. I do not think that cases operated upon by the old operation and before the aseptic wound treatment had been introduced should be classified with those operated upon by the Modern Method. If a case has been free from any evidence of inflammation for one year it seems one should be justified in claiming a cure. Especially as by the present method of operating, the cavities are opened to direct inspection, whereas by the old method the disease was frequently overlooked in the unopened cavities and remained dormant until some irritation, such as exposure to inclement weather, changes of the seasons, declining health, etc., brought it into activity again. I see no reason why an operation upon any part of the body should be a guaranty that disease should never return in this particular region, for even if there is no trace of the primary disease after an operation, the nutrition of the part has been altered to some extent by changing the normal anatomical relations, and the resulting cicatricial tissue formation and enervation make the operated part in a greater or less degree, according to its location in the body, a *locus minoris resistentiæ* during the remainder of the patient's life. Even with the modern operation we shall have returns of cholesteatoma in some cases, because it is not always possible to remove every epithelial nest.

But with tympanum, attic, antrum, and, if found necessary, the mastoid cells, made into one cavity, which can be easily inspected through the external meatus, any new formation can be readily removed with a curette, and consequently the patient need never suffer any serious inconvenience beyond an occasional inspection and removal of any epithelial masses, just as we are at irregular intervals called upon to remove accumulated cerumen from the external canal. This, of course, applies only to cases where the disease is limited to the middle ear, and not where the cholesteatoma extends to the internal ear—a condition which fortunately seldom occurs.

The question, how shall we determine when to perform simple excision of the ossicles through the normal external canal, and when to make the radical operation, is not always an easy one, as will be seen by reading rule 5, under the heading of "Indications for Opening the Mastoid"; also "Indications for Excision of the Ossicles." (a) Rules 1 and 2. (See translations above from rules laid down by Schwartze.)

So far, we know of no positive signs or symptoms by which we can determine when the disease is limited to the ossicles, and when it is limited to one or more of the cavities within the middle ear, with or without caries of the ossicles.

But we are beginning to learn from experience that the ossicles are in the majority of cases *secondarily* affected, and, as a result, simple excision will be made *relatively less*, and the radical operation *more* frequently.

While it is true that removal of the ossicles facilitates the cure of diseased parts in the cavities, because permitting a more ready application of medicines, yet the thorough exposure and removal of all affected parts at once by surgical means, under strict aseptic precautions, *as is practised in other portions of the body under similar conditions*, is far more scientific than to submit the patient to the tedious process of waiting for nature to cast off the necrosed tissue.

In the hands of a *qualified operator*, the danger incurred by the operation *per se* is very small. Of one hundred cases

operated upon by Schwartz, five per cent. died—one of uræmia, one of chronic abscess of the brain, two of meningitis, and one of sinus-phlebitis with pyæmia. It will be seen that these were almost all cases where the fatal disease probably existed at the time of the operation, and they were in all probability little, if at all, aggravated by the surgical interference. So that in cases where the inflammation has not extended to the vital parts, or where no serious disease exists, such as uræmia, diabetes, etc., in an advanced stage, the fatality is so nearly *nil* that there should be no hesitancy to operate.

The literature is full of reported cases where the usual medications *appeared* to have cured without operative interference; but if watched long enough we shall find that, except in a very small percentage, the discharge recurs.

I do not wish to be understood as being opposed to careful treatment by the ordinary methods; but if with thorough treatment we fail to arrest the difficulty within a reasonable time *we should operate*. Furthermore, if at the very beginning we find evidence of necrosis, the operation should not be delayed.

Case No. 5 illustrates this perfectly. To all appearances she was perfectly cured for six months, when suddenly the inflammation was lighted up anew, and an operation proved that she had been suffering from necrosis of the bone, and the formation of a large cholesteatoma; the beginning of these pathological changes evidently dating back several years.

CASE I.—Isaac Quaw, æt. twenty. Right ear had been discharging more or less constantly during the past six years. Six weeks ago pain became intense, and discharge very profuse and offensive. Dizziness and headache were frequent. Above ear and mastoid the parts were swollen, but not very tender. Pressure over this region caused pus to ooze from the external canal, the latter being swollen and much inflamed so that it was impossible to obtain a view of the memb. tym. Heard watch on firm contact, loud conversational tones close to the ear.

¹ *Handbuch der Ohrenheilkunde*, Band II., S. 823.

Operation, March 11, 1892.—Usual incision was made behind auricle, evacuating about 4 oz. of pus. Upper portion of canal and mastoid denuded, but not discolored. The remnant of memb. tymp. was covered with granulations. Removal of these revealed the fact that they protruded through openings in Shrapnell's membrane and the posterior segment of drum-head. Hammer and anvil removed, caries on long process of anvil and head of hammer; attic filled with granulation tissue, which was thoroughly curetted; pus in antrum. No caries of walls found.

Wound behind auricle closed completely by superficial sutures. Dressing and sutures were removed on the third day, and union by first intention found. At no time after the operation did patient have any elevation of temperature. Was discharged in six weeks.

On *April 24, 1893* patient was sent for and examined. Ear was unchanged. Line of incision behind auricle was of a pale red color, and there was some tendency to keloid formation. External canal was free and healthy, admitting of free inspection. Hearing distance, watch $\frac{5}{16}$, whisper tones 10 ft.

CASE 2.—Robert Gurlock, 46 years of age. Was admitted to the Cincinnati Hospital, Jan. 4, 1892, suffering from chronic otitis media purulenta. Gave history of repeated attacks of pain and discharge from the left ear, since in the German army during the war of 1870. Had complete facial paralysis on the left side, this having developed about five weeks previously. Patient complained bitterly of intense noises in the left side of head. There was a thin yellowish offensive discharge from the left ear. There was no tenderness over mastoid, nor external evidence of inflammation.

Operation, Jan. 29th.—Bone over mastoid appeared healthy; a small button was removed from the mastoid and cells found normal. Attic and antrum filled with granulations; hammer removed, neck carious; anvil could not be found. Cavities curetted and promontory carefully examined for denuded bone, but none could be detected.

Posterior wound closed by sutures and ear dressed as usual. Stitches removed on the third day. Union by first intention. No fever.

Feb. 25th.—Cavity rapidly becoming covered with healthy epithelium, but facial paralysis was still complete. Patient left contrary to advice.

March 1, 1893.—Patient again examined in hospital where he was recently admitted on account of another disease. Ear dry, but facial paralysis was still present.

CASE 3.—Mrs. John Curran, age fifty-two; well developed and nourished. Gave history of deafness and discharge from both ears at irregular intervals, dating back many years. Discharge more profuse during the last few months. Was first examined April 10, 1892. In this history only the left ear is considered, being the one upon which the operation was performed.

Status Præsens.—Profuse discharge of yellow offensive pus. There is a small circular perforation anterior to the handle of malleus; ear readily inflated; large bubbling râles heard through diagnostic tube. There is no swelling or redness about the ear, but pressure over the mastoid elicits tenderness. Cannot hear watch on contact, and only very loud voice indistinctly when spoken into the ear.

Patient objected to operative interference, so the case was treated daily by the usual methods from April to September without any visible improvement. She now began to suffer from severe pain in the head and dizziness. Convergent strabismus of the left eye also developed, but no evidence of optic neuritis. A few days later she developed fever, redness and pain over mastoid, and then readily consented to an operation.

Sept. 27, 1892.—Patient entered private ward in Good Samaritan Hospital and was operated the same day. Ether narcosis. The usual incision through tissues more than one inch in thickness, requiring an incision backwards at right angles to the first, in order to expose mastoid. There was free hemorrhage from the dark-colored swollen tissue. The bony plate over the mastoid was extensively necrosed, of a dark, greenish-black color, and perforated at two points. Antrum filled with pus and granulations. The trabeculae of mastoid dark-colored and broken down. All of mastoid removed, excepting the outer shell at apex. At the angle of lateral sinus the dura was exposed over an area $\frac{1}{2}$ inch in diameter. Posterior wall of osseous canal removed, also the anvil and hammer, with the enormously thickened memb. tymp. Middle ear and attic filled with pus and granulations, and in several places the probe touched denuded bone. Hammer was found to be normal. Anvil exhibited beginning erosion of body. Duration of operation one hour and fifteen minutes.

On the second day the temperature rose from normal to 100°.

For four days she had not had movement of bowels, and free evacuation of the latter was followed by cessation of the fever which did not return again. The loss of bone behind the auricle was so extensive that the case healed with an opening at this point. Patient was discharged January 23, 1893. Duration of treatment, four months.

July 5, 1893.—Two months after being discharged, she returned on account of a slight discharge of foul-smelling pus, through the defect left behind auricle. I found a small fistulous tract leading upward and inward; a probe came upon a very small area of carious bone. Every other portion of the united cavities normal. The necrosed area I curetted repeatedly, the last time exposing the dura over an area 3 mm in diam., the immediate effect being dizziness and unsteady gait of about 15 minutes' duration. Fortunately the opening left after the operation enabled me to *locate* and *see* the affected part. The pulsations communicated to the dura can be seen in the defective area which is slowly becoming smaller.

CASE 4.—Galen Perrin, age fourteen; well developed and nourished. First came under observation in August, 1891.

Right Ear.—Chronic purulent otitis media, which developed 10 years before during an attack of scarlet fever. Has been under treatment off and on ever since, most of the time in charge of very excellent men, yet the disease was never entirely controlled. There was no external evidence of inflammation or tenderness about the ear or over the mastoid. Memb. tymp. was entirely destroyed, excepting a narrow crescent upwards, about $\frac{1}{16}$ in. in its widest portion. There was no sign of the handle of malleus. Tympanum filled with granulations. A bent probe could be passed behind the remnant of the membrane, up into the attic, a distance of about $\frac{1}{4}$ in. without causing pain; but the cotton invariably would be covered with thick, offensive pus. Patient also suffered from hypertrophic nasal and pharyngeal catarrh. This was treated by galvanic cautery and local applications, combined with internal medication. Ear also received treatment two or three times a week at the office, in addition to daily treatment at home. By December the nose and throat were in good condition, and the visible granulations had disappeared from the tympanic cavity; but discharge continued to come from above, notwithstanding irrigation and treatment of the attic. Treatment was continued irregularly from December, 1891, until

October, 1892. Several times the case appeared to be entirely cured, but as often there would be a return of pus, finding its way down from the attic.

Patient was admitted to private ward of the Presbyterian Hospital, October 12, 1892. Anæsthetic, chloroform. In the beginning of the operation the lateral sinus was exposed, but not injured. This case belonged to that class where the lateral sinus is displaced far forwards, leaving but little room between the posterior wall and the vessel. Granulations and thick pus found in antrum and attic. Posterior wall of the osseous canal chiselled away. Anvil removed and found normal. Hammer and rest of memb. tymp. removed. The entire handle of the hammer was lost through necrosis; neck and head partly eroded. Temperature never went above $99\frac{1}{2}^{\circ}$. Was permitted to get up on the third day. Exuberant granulations controlled by the nitrate of silver stick, and on two or three occasions by packing the cavity with powdered alum. In three weeks wound behind ear was permitted to close.

Dec. 28, 1892.—All of cavity covered with healthy epithelium and case discharged. Duration of treatment, ten weeks. Could hear ordinary conversational tones with the operated ear at a distance of twelve feet.

May 10, 1893.—Ear remained dry, and hearing same as when patient was discharged.

CASE 5.—Emma Pfeiffer, age eighteen. Came under treatment in May, 1892. Patient gave history of frequent attacks of pain and discharge from both ears during childhood. On the left side this had continued at irregular intervals till the present time. The discharge was not very profuse, but fetid, and a large polypus filled the auditory canal. This was snared, and pedicle appeared to spring from the attic, passing out through an opening in Shrapnell's membrane. There was no external evidence of any inflammatory process, and but slight tenderness over mastoid. There was, in addition to opening in membrana flaccida, extensive alteration and retraction of memb. tymp., with large perforation in posterior segment. After three weeks' treatment discharge had ceased, and the case appeared to be well. This deceptive condition continued for nearly *six months*, when she returned on account of severe pain radiating from the ear over the left side of head. Discharge slight and fetid. She had recently suffered much from dizziness, at times so severe that she had been obliged

to lie down. Through perforation in Shrapnell's membrane, a grayish mass presented, strongly resembling a cholesteatoma; but patient had become so sensitive to manipulation that a thorough examination was impossible.

Admitted to private ward in Presbyterian Hospital, Nov. 28, 1892. Chloroform. A probe passed readily upwards into attic through the perforation in the membrana flaccida. Bone over mastoid appeared healthy; outer plate rather thick. Antrum was filled with granulations and a slight amount of thick pus. Probe readily passed from antrum to attic. The posterior wall of external auditory canal was removed, and then for the first time did the true character of the case become positively established. The attic and a large space inward and upward which had been eroded by the formation was filled with cholesteatomatous masses. The anvil did not exist, and of the hammer only the handle and a small portion of the neck remained, which, with the remnant of the memb. tymp., were removed, and all the parts thoroughly curetted. Lacunæ, or nests of cholesteatomatous masses in bone, carefully searched for and removed with chisel and curette. Mastoid cells not involved. The stapes could readily be seen and an oscillating movement communicated to it with a probe. A noticeable feature in this case was the marked and persistent fixation of the eyes to the left for about two hours after she became conscious. With a strong effort she could move the eyes past the median line toward the right, but only for a moment, when they would return to the extreme position toward the left. There was much retching and efforts at vomiting; complained of intense noises on the left side of head, which gradually disappeared. Patient left hospital on the tenth day, and came daily to the office for treatment.

Dec. 27th.—The new granulations covering denuded bone in attic having become too exuberant, were curetted and cauterized with fused argentum bead. The following day there was slight paresis of left side of face, which on the 29th became complete, lasting about two weeks, when it had entirely disappeared again. The granulations were rather persistent in this case, but packing ear with powdered alum soon reduced them. Seven weeks after the operation, opening behind the ear was encouraged to close by packing cavity through external canal only.

Feb. 22, 1893.—All of cavity absolutely dry and covered with epithelium, and case discharged. Duration of treatment, eleven weeks.

June 4, 1893.—Patient was sent for and re-examined. Ear in same condition as when patient was discharged. So far there had not been the slightest evidence of any return of the cholesteatoma. Hears ordinary, distinct and slowly spoken conversation at twelve feet with operated ear.

CASE 6.—Ambrose Welsh, age four; scrofulous type. History prior to entering hospital not obtained. Admitted May 3, 1892. Ear treated daily, but without arresting discharge. When I went on duty in September, found profuse discharge from ear of fetid pus through large perforation in posterior portion of membrane. External canal inflamed; memb. tym. of a dark red color. Tympanum filled with granulations and pus; auricular glands enlarged. Mastoid not swollen, but tender upon pressure. Pharynx filled with adenoid vegetations, which I removed. Treatment of ear continued, but without improvement.

Operation, Oct. 7, 1892.—Chloroform narcosis. Increased vascularity of the bone. Antrum filled with greenish pus and granulations. Removed posterior wall. Hammer normal. Long process and body of anvil necrosed. Attic and middle ear filled with granulations. All parts curetted thoroughly.

Temperature rose to $100\frac{1}{2}^{\circ}$ in the evening following operation. Dropped to normal during the night, and remained so until the fourth day, when the wound was redressed, the temperature rising to 103° within two hours after the dressing, but soon falling again to normal. This rapid rise and fall of temperature occurred after a number of succeeding dressings, and then gradually ceased. Wound behind auricle allowed to close in the fourth week. In ten weeks cavity was perfectly dry and covered with healthy epithelium. On account of patient's youth a satisfactory hearing test could not be obtained, but closing the other ear as well as could be done by bandage, etc., child heard ordinary conversation when addressed to him.

CASE 7.—Ambrose Norwood, aged two years; fairly well developed and nourished. Admitted to Cincinnati Hospital June 14, 1892, on account of purulent discharge from both ears and nose. History of case prior to entering hospital not obtained. Patient was treated by means of syringing, local and internal medication. When I went on duty in September, found the following condition:

Left Ear.—Post-auricular gland enlarged; no discoloration or swelling of mastoid, but pressure upon same caused pain. There was free discharge of pus from the external canal. Through large

perforation in memb. tymp. exuberant granulations protruded which bled profusely when touched with the probe.

Right Ear.—Perforation of memb. tymp. in the anterior quadrant; membrane but slightly injected, and the discharge moderate.

Unable to obtain satisfactory hearing test on account of patient's youthfulness. Pharynx filled with adenoid vegetations. These were promptly removed under chloroform.

After removal of vegetations, the local treatment being continued, the right ear ceased to discharge, and nasal respiration was re-established; but the left ear was not improved, and patient was operated upon December 14th. Chloroform narcosis. Bone over mastoid appeared normal; antrum filled with pus and the inflammation extended into the mastoid cells. Posterior osseous wall removed. Hammer and anvil removed with remains of the much thickened memb. tymp. *Both ossicles normal.* Tympanum, attic, antrum, and mastoid cells thoroughly curetted. Temperature rose to $100\frac{1}{2}^{\circ}$ the following day; became normal on the third day and continued so until patient was discharged. In the third week after the operation, the opening behind auricle was permitted to close, and six weeks from time of operation the cavity had become covered throughout with epithelium. The discharge had entirely ceased. There was no cicatricial contraction of meatus; in fact, it was larger than before the operation, permitting a large speculum to be inserted and all of cavity inspected.

CASE 8.—Nellie Hoffman, age two and one half years. Patient has been in the Cincinnati Hospital over a year. Treated both medically and surgically for intestinal trouble, eczema, etc., and at the same time treated by the Otological Department for a profuse aural discharge, most marked on the left side. All of the usual remedies had been faithfully tried, but in vain. Six months before the operation the adenoid vegetations in the pharynx were thoroughly removed and nose treated with the hope that this would influence the discharge from the ears, but without any avail. She is a typically strumous child with a very large abdomen and numerous enlarged lymphatics. The memb. tymp. of a dark red color, much thickened, and posteriorly there was a very large perforation.

Operated upon May 4, 1893.—Bone externally healthy. Antrum and attic found filled with pus and granulations. Posterior wall

of external canal removed. *Hammer and anvil both normal.* Parts thoroughly curetted. Mastoid cells not involved. Wound behind the ear closed by superficial and deep sutures, which were removed on the third day; union by first intention. Not the slightest evidence of any inflammation. It should be mentioned that the temperature fluctuated daily, but this condition existed for months before the operation. There had scarcely been a day during the month prior to the operation that the child did not have some temperature; and frequently it would run up as high as 104° , so that it is impossible to say how much, if any, of this pyrexia was due to the operation and how much to other causes.

June 4th.—Child looking better. Epithelium covered about one half of the total area of denuded bone, and the balance was protected by healthy granulations. There was only a fine, delicate red line visible behind the ear along the line of incision (see Fig. 8).

CASE 9.—William Ahems, age twenty-six. Patient is a miner by occupation. States he has never had trouble with ears until a few months ago, when he suffered from otalgia on the left side, followed by discharge of muco-purulent secretion. The discharge has continued ever since. There has been very little pain. When admitted to the hospital he had no fever or pain, but a very profuse and offensive discharge from the left ear. Could not hear watch on contact, and loud voice spoken into ear only very indistinctly.

Operation, May 11, 1893.—There was no external swelling, but on pressure one elicited tenderness over the mastoid. Anæsthetic, ether. Bone when exposed was found to be riddled with numerous small bleeding points, and in two places granulation tissue was protruding through the cortex. With a raspatory one of these openings was enlarged, and at once a jet of thick yellow pus poured forth, about a tablespoonful escaping. This was followed by a profuse flow of dark-colored blood, so that at first I thought the lateral sinus had been opened. The hemorrhage however, soon subsided. All of the external plate of the mastoid was now removed down to the apex and backwards and upwards a distance of two and one half inches from the meatus. The antrum and attic were filled with granulation tissue and pus. The anterior portion of the memb. tymp. was destroyed. Shrapnell's membrane intact. On removing the hammer and anvil, the former was found to be slightly necrosed, while there was no evi-

dence of disease on the latter. Backwards and upwards the bone was entirely destroyed, and over an irregular area the size of a half dollar, the thickened dura was exposed. It was in this locality that the accumulation of pus had taken place (subdural abscess), and the elasticity of the brain explains the jet-like escape of pus first mentioned.

During the operation patient's breathing became very bad, and it was necessary to elevate the body, and resort to artificial respiration. Operation continued with head lowered and body at angle of 30° , and anæsthetic changed from ether to chloroform.

Both external canal and the large defect behind the auricle packed with iodoform gauze. No temperature until the third day, when it went up to 100° . Bowels were freely evacuated, and temperature sank to normal, and has remained so. He was permitted to get up on the third day. Healthy granulations rapidly covering all of the denuded bone.

June 4th.—Patient could hear watch very distinctly on contact, and ordinary conversation within twelve inches of the ear. So that his hearing, even at that time, had at least doubled in acuity on this side.

June 6th.—Patient left hospital against advice, stating that he felt perfectly well and wanted to go to his home in Illinois. So that for the present, at least, this case has been lost sight of.

CASE 10.—John Battenfield, age twelve, was operated upon one year ago by myself. At that time the *classical mastoid operation* was made. The ear had never entirely ceased to discharge. There had been less pain and headache than before the first operation, but the discharge had been quite offensive and the ear tender in the region of the mastoid. His general health, however, had been most excellent, and he had developed very much physically.

Status Præsens.—Patient can only hear watch on contact and loud voice close to ear. There is no external swelling, but ear very tender to pressure, and patient will not permit of a careful examination.

June 1, 1893.—Admitted to private ward, Presbyterian Hospital; prepared for operation in the usual manner. After anæsthesia (chloroform), an examination was made through the external meatus, and with cotton carrier the parts carefully dried. The region of Shrapnell's membrane was represented by an opening filled with a grayish mass, strongly resembling chole-

teatoma. Further examination was prevented by profuse bleeding from the parts, resulting from the efforts to cleanse same, so that they could be carefully inspected. The usual incision was made, extending from the apex to lobe, behind the ear partly through the old scar, which was of a keloid character. When the knife passed over the mastoid where it was opened last year, it sank into a soft mass; and with the blood small caseous masses escaped. Periosteum was freely laid back and revealed an opening in the mastoid an inch long and half an inch wide, kidney-shaped, being a part of the area removed last year, which had never closed. Through the opening granulation tissue presented, and on removing this with the curette there was a free escape of fluid, almost clear in color, but having mingled with it numerous small particles of caseous material and grayish-colored, flaky masses, evidently from a broken-down cholesteatoma. The probe entered readily into the antrum and attic, which were unusually large, the walls being lined with a pearly-colored ragged, membrane, and in some parts this membrane had entirely disappeared, leaving denuded bone. All of the posterior osseous wall was chiselled away; the ossicles were carefully searched for, but the anvil had entirely disappeared, and of the hammer only the handle with the processus brevis and a fragment of the neck remained intact. The bone was honeycombed in all directions, the depressions being filled with cholesteatomatous masses. Every spot that gave the slightest indication of being the seat of infiltration was carefully curetted or chiselled out, until nothing but hard bone was found in all directions. The bleeding was very free from numerous minute bone vessels. The mastoid cells were free from cholesteatomatous masses, but filled with granulations and pus. All of the mastoid curetted and chiselled away, leaving only the shell of apex for insertion of muscle tendons. The diseased bone extended upward and backward two inches from the external meatus. Two sutures were taken above and below the wound and a large opening left behind the ear. Duration of the operation, one hour and fifty minutes.

CASE II.—Nicholas Brown, age seven years.

June 21, 1893.—Patient admitted to private ward of Presbyterian Hospital.

An effort was made to obtain hearing distance of patient's right ear. He seemed to hear ordinary low conversation at a distance of three or four feet.

Chloroform narcosis. The mastoid on the right side and for some distance back was distinctly enlarged as compared with the left, but there was not the slightest evidence of any inflammatory condition. There was slight tenderness on pressure over this area, and the swelling led me to suppose that it was caused by a large cholesteatoma pressing the cortex outward. When the periosteum was laid back the most prominent area over the mastoid was found to be of a bluish color, which led me further to believe that my original surmise was correct. Chiselling into the bone, however, by the usual method, I was much surprised on entering the antrum, to find this outer plate quite thick and composed of spongy bone, but filled with blood-vessels, causing free bleeding. The bone was not necrotic. Antrum readily entered. It contained cholesteatomatous shreds with slight amount of pus, but no granulations visible, and appeared very large and was lined with a pearly gray membrane. The probe passed readily into the attic. The posterior wall was removed and the ossicles carefully searched for, but there was not the slightest vestige of hammer, anvil, or membrana tympani. Of the stirrup, only the foot-plate remained intact. The cavities were curetted. A catheter was passed through the right nostril, and a bougie passed through the catheter so as to demonstrate its entrance through the Eustachian tube into the tympanic cavity, which was readily done.

The case was plainly one of disintegrated cholesteatoma, as only the lining membrane with enlarged cavities remained, the cholesteatomatous masses themselves having been washed away by the syringing and treatment which the child had undergone during the past few months, as the water could freely enter into the attic and antrum if sufficient force was used, because the ossicles and drum had been destroyed and all the cavities enlarged by the eroding effects of the tumor. The lateral sinus was exposed during the operation in three places, each about the size of a millet seed.

The cholesteatoma had eroded the bone backward and upward, being practically an extension from the antrum while freely curetting this cul-de-sac the probe came upon the dura, and further curetting was desisted from. Parts dressed as usual, leaving wound open behind auricle. Duration of operation one hour and twenty-five minutes.

CASE 12.—Julius Bludau, Jr., age eleven years.

June 22, 1893.—Thirteen months before I had made the *classical mastoid operation* upon this patient for incurable otorrhœa. The ear had never entirely ceased to discharge offensive matter, and there had remained tenderness on pressure over the mastoid especially near the apex. In this region the scar was of a keloid character, and contained a small fistulous opening which the patient stated had only recently appeared, through which a gelatinous substance exuded.

The odor from ear was very offensive, and a slight amount of thick pus was found in the external canal. There was a large opening in the posterior half of memb. tymp. Middle ear filled with granulations. The condition of Shrapnell's membrane was not well defined.

Incision from upper portion of concha to apex of mastoid, passing through old scar. Periosteum laid back, and it was then found that the opening made in the mastoid before, had never entirely closed. When cleansing the external canal with a cotton plug, it forced thick pus out through the opening in the mastoid showing that there was a very free communication between the cavities. The old opening was enlarged, and the probe entered the attic readily. Found the aditus ad antrum very roomy. Posterior wall of external canal cut away. Antrum and attic filled with pus and granulations, the latter very large, almost polypoid in size. The anvil carefully searched for, but could not be found. With a sharp knife the rest of membrana tympani was detached, and the hammer removed. It was then found that the head of the hammer had been entirely eroded, but adhering to the neck by granulation tissue was a small remnant of the anvil, including a part of the articulation of either the long or the short process, the erosion had been so extensive that it was impossible to distinguish which of the two it was. The diseased bone was thoroughly removed. The middle ear was filled with granulations which were curetted to the mouth of the Eustachian tube. There was very free and persistent bleeding from numerous little bone arteries. Duration of operation, two hours. Opening behind auricle entirely closed by sutures and ear packed through the external canal.

Cases 8, 9, 10, 11, and 12 have all been operated upon during the past six weeks, and, with the exception of Case 9, who left against advice, are still under treatment. From

the others it will be seen that the shortest time for the parts to heal after the operation was six weeks, the longest, four months, and that in Case 3 where diseased bone was left behind and suppuration recurred.

The granulations must never be permitted to become exuberant, for then adhesions are sure to form across the angles of the cavity, leading to the formation of little canals and blind pouches that will materially interfere with the favorable progress of the case.

After the removal of the first dressing, the cavity should be carefully packed with very narrow strips of plain, sterilized gauze. As the granulations become larger we must make firm rolls from pieces of gauze about 1 cm square, and pack them tightly into the corners of the cavity, and as we approach the canal finish with short and narrow strips. Should the firm packing fail to control the granulations, they must be reduced with the curette or nitrate of silver stick. I have also been very successful in controlling them by packing the cavity with powdered alum for twenty-four hours; it seldom needs to be repeated more than two or three times.

All syringing and irrigating of wound after the first dressing must be avoided (excepting for removal of alum packing or in case the discharge should be very free and offensive), as it is injurious to the formation of new epithelium.

The hearing was improved in all cases; in some only slightly, in others very markedly.

In all of the cases the rise of temperature was practically nil, with the exception of Case 8, the child who had suffered from an irregular fever prior to the operation.

Eight times, or in 66 %, the hammer, and six times, or in 49 %, the anvil was affected; in 33 % both the ossicles were affected or entirely destroyed; and in 16 % both ossicles were normal. Cholesteatoma was found in 25 %, and in one (Case 9) there was also an extra-dural abscess present. There were no accidents of any kind, during or following the operations. With the exception of Case 3 there has been no recurrence up to date, so that of those discharged 85.8 % remained free from any evidence of the disease for which the operation was undertaken.

Upon Cases 10 and 12 I operated about one year ago for incurable otorrhœa, making the classical Schwartz operation, which permitted a free current of water to flow through the canal and out of the opening in mastoid, or *vice versa*. During the prolonged treatment which followed the operations the discharge was at a minimum, but could never be entirely controlled for reasons easily explained after making the radical operation. In Case 12 the ossicles were found almost destroyed and the roof of attic affected with caries, while in the other there existed an unrecognized cholesteatoma, with anvil totally and hammer partly destroyed.

These two cases are to my mind most excellent proofs of the great value of the radical operation and of its vast superiority to the old method in chronic cases.

A CONTRIBUTION TO THE ANTHROPOLOGY OF THE EAR IN CRIMINALS.

By DR. HANS DAAE, CHRISTIANIA,

FIRST ASSISTANT TO THE CLINIC FOR EYE, EAR, AND THROAT DISEASES.

Translated by Dr. WARD A. HOLDEN.

LONG ago artists and scientific men called attention to the varying aspect of the ear, and believed its form and size to have some relation to the character of the individual.

Morel (1837) showed that debased individuals had not only an altered moral nature, but also corporeal deformities. These latter were called *stigmata hereditatis*, and among them he, and later Lombroso (1871), included anomalies of the ear.

These were studied statistically and classified by aurists and anthropologists, and particularly by Gradenigo, Vali, and Petrona Eyle. The latter described as a type the "criminal ear." All agreed that the auricular cartilage in criminals and the insane showed more and greater anomalies of form than in normal individuals, and in proof of this view many statistics were collected after long investigations, carried out, however, without regard to any unit of measure. Gradenigo examined the ears of 15,000 normal men, and of 10,000 normal women, and noted the percentage of normal ears. He then examined 800 insane persons and 467 prisoners, noted the percentage of normal ears, and compared them with those of the first category.

He classified the anomalies as:

- I. Simple adherent lobes.

2. Projecting ears.

3. Very large and moderate-sized lobes, etc.

Of the criminals only 28 per cent. had normal auricles, while of the normal men 56 per cent., and of the normal women 65.6 per cent. had normal auricles. Normal individuals then have normal auricles twice as often as criminals. This result would be satisfactory providing that one could establish a criterion of the normal ear and that the limits between a normal and an abnormal ear could be sharply drawn. This, however, has not been done.

In my opinion all these studies are of but relative value, since they only show that the investigator in question believes that anomalies of form are found more frequently in criminals than in others. But being based upon subjective judgment and not upon measurements, they cannot be verified by others.

What one would call a large ear, another would consider normal; what one would call prominent, might not be considered so by others, etc.

In order to possess scientific value the results should permit verification.

It has been my purpose, without taking into account the interesting results of these investigators, to endeavor to find out, with the assistance of statistics, whether the ears of criminals stand at a less reduced stage of development than those of normal individuals, in order to discover the anthropological position of the criminal ear.

Former investigators have studied only single portions of the auricle; my studies have taken into account the entire auricle. A marked reduction of the individual portions of the human auricle, and particularly the distance from Darwin's tubercle to the base line, as compared with the ear of the lower animals, are considered signs of a higher stage of development, while an abnormal size and excessive development are considered signs of degradation.

Measurement of criminals' ears to be of value must be compared with measurements of normal ears. In the *Festschrift für Prof. Virchow*, 1891, Schwalbe gives detailed statistics of measurements of the auricular cartilage in Ger-

mans, and my conclusions are drawn from a comparison of my results with his. Schwalbe's measurements were made on the dead bodies of normal individuals. I do not know what apparatus was employed. Usually in measuring the ears of criminals to determine their signalments Bertillon's measure is used. For my purpose I employed a plate of mica 10 by 5 *cm* engraved with a millimetre scale.

The measurements made were six:

1. Greatest length.
2. Greatest breadth.
3. Actual length, measured from Darwin's tubercle to the incisura auris anterior just above the tragus.
4. Actual breadth—*i. e.*, the base line.
5. The distance from Darwin's tubercle to the upper point of insertion of the auricle, upper line.
6. The distance from Darwin's tubercle to the lowest point of insertion of the auricle, lower line.

The last two lines, together with the base line, form a triangle, the height of which determines the degree of development of the ear. From these measurements the physiognomic index is calculated—*i. e.*, the relation between greatest length and greatest breadth of the ear (the expression for the physiognomic characteristic); and also the morphological index—*i. e.*, the relation between the actual length and the actual breadth of the ear (which is the expression for the anthropological characteristic).

Besides this I have determined the relation between the greatest length of the ear and the height of the individual, as well as the age, place of birth, and nature of the crime.

The measurements were made on ears of convicts in the prison in Christiania. The convicts ranged in age from 18–65, and may be grouped as follows:

15–20	20–30	30–40	40–50	50–60	60–70
22	148	58	18	2	4

The superintendent of the prison had the kindness to indicate particularly those who had been imprisoned more than once, as these might be supposed to represent a more degenerated class.

In the accompanying table the upper numbers are my measurements, and the lower those of Schwalbe. Where the latter are wanting the examinations have not been made.

From this table the following conclusions may be drawn:

1. Like Schwalbe, I find the length, breadth, and base of the ear increasing with the age. The fact that my numbers are smaller throughout is striking, as is also the decrease in length and breadth between 20 and 30, probably owing to a more excessive contraction of the cartilage at this age of greatest vigor.

According to Schwalbe, the increase in length, breadth, and base with age is due to a relaxation of the elastic fibres in the subcutaneous tissue of the cartilage, with the resulting decrease in curvature.

As the length increases more than the breadth, the physiological index becomes smaller.

The ear in old age is therefore actually larger than in youth, both in length and breadth, but relatively narrower, since the length increases more than the breadth.

2. The three distances from Darwin's tubercle to the base line decrease in age. Darwin's tubercle thus comes nearer the base line in advancing years. If the length, breadth, and base increase, this decrease must be due to the fact that in age the ear projects farther from the head than in youth, or that the helix-margin shrinks with age. The latter is not improbable.

Age.	15-20	20-30	30-40	40-50	60-70	Varies between	Average.
D. Greatest length.	62.1	60	63.3	64.1	66	51 and 75	61.35
S.		60.3	63.7	63.7	67.4	50 and 80	65.9
Greatest breadth.	37.7	36.8 38.3	38.1 38.1	36.6 39.4	38.3 39.5	31 and 46 32 and 53	37.5 39.7
Base line.	40	40.8 41.9	41		45	34 and 49 33 and 58	40.6 44.4
Physiognomic index.	60.7	60.6 61.7	60.46	57.56		50 and 74 50 and 78	60.25 60.5

Age.	15-20	20-30	30-40	40-50	60-70	Varies between	Average.
Actual length.	31.7	31.2	30.6		29.9	23 and 41 22 and 49	31 35.9
Upper line.	31.9	31.4	29.9			23 and 41	31.2
Lower line.	44.3	43.9	43.7			34 and 55	43.8
Morphological index.	131.3	131.7	136.5		146.5	100 and 200 83.7 and 195.5	132.8
Relation between the greatest length of the ear and the height of the individual expressed in thousandths.	37.9	37.5	35.8	38.7	39.2	31 and 44	37.5 39.9

3. Up to the 30-40th year the length of the ear decreases as compared with the height of the individual. In infants of one month the relation is 7 %, and gradually decreases up to the 30-40th year.

Up to 30-40 the individual grows relatively faster than the ear; from 30-40 on the ear grows, while the individual becomes smaller, and the relation more nearly resembles that of childhood.

4. As was to be expected, my results are on the whole in perfect accord with the measurement of the ears of normal individuals.

Darwin's tubercle is not always present. In my cases it was found altogether in 49 % (Schwalbe, 73 %); bilaterally, 27.7 % (Schwalbe, 70 %); only on the right side, 14.6 % (Schwalbe, 12 %); only on the left side, 6.5 % (Schwalbe, 7 %); and in 51 % (Schwalbe, 11 %) altogether wanting.

It is remarkable that I found Darwin's tubercle so much less frequently than Schwalbe, and often so much lower on the helix.

My investigations and those of Schwalbe show that the form and size of the auricular cartilage vary with age in

the same individual. Nor can two persons be found whose ears are exactly similar.

Between 25-40, the ear changes least in a given individual; before and after this period there may be a considerable change within a short space of time. Since, however, the ear retains its form in spite of mimic movements, it is well adapted as a signalment, and on Bertillon's recommendation it is thus used in France and other countries.

As has been stated, my measurements, as compared with those of Schwalbe, are small. The ears of Norwegian criminals seem to be smaller than the ears of normal Germans.

Measurement of eight ears of Lappish criminals showed the ear to be very small in comparison with the height of the individual (3.57 %), although all were small persons. The physiognomic and morphological indices were, however, normal. The Lappish ears are normally formed, but small.

My results in brief are as follows:

1. The size of the auricular cartilage and
2. The form of the auricular cartilage vary in the same individual with age.
3. The projection of the ear from the head increases with age.
4. The auricular cartilage of Norwegian criminals seems to be smaller than that of normal Germans; and the ear is smallest in Lappish criminals, a lower tribe.
5. The auricular cartilage in criminals stands anthropologically on the same plane as in other individuals, since the morphological index is the same in each; therefore, according to my investigations, there is no type which may be considered the "criminal ear."

CONTRIBUTION TO THE MICROSCOPIC ANATOMY OF THE HUMAN NASAL CAVITIES, PARTICULARLY OF THE OLFACTORY MUCOUS MEMBRANE.

BY DR. HERMANN SUCHANNEK, ZURICH.

Translated by Dr. J. A. SPALDING, Portland, Me.

(With Eighteen Schematic Drawings.)

WHEN I spoke, in a previous paper,¹ of the peripheral border of protoplasm attached to the ends of the supporting and olfactory cells of the human nose in infants, I referred to some structures which I called the "*unpigmented bell cells*," in contradistinction to the pigmented cells in older children and in adults. But as the term "*bell cell*" hardly corresponded with the description I gave, I gladly adopt the more appropriate title of "*hand-bell cells*," as suggested by v. Brunn.²

In the paper referred to I remarked that the peripheral protoplasmic border exhibits a few round cells and nuclei apparently of an artificial nature, with a diameter of 0.009 *mm*, and with the protoplasm arising around them in a conical shape, so that the cell and nucleus together measure 0.015 in diameter.

In addition to these *unpigmented* structures we see in children and adults some that are pigmented.

My opinion of these pigmented cells, as expressed at the time, but based on a very small number of examinations,

¹ *Archiv f. Micros. Anatomie*, Band xxxvi., p. 375.

² *Ibid.*, Band xxxix.

was that they were either offshoots of the pigmented supporting cells, or else pigmented leucocytes. I also felt compelled to abandon the idea, expressed in my previous papers, that they were *specific elements of special sense*.

We now know, in agreement with Stohr's observations, that there is nothing remarkable in the presence of migratory epithelial cells wherever in animals we find a subepithelial locality for the propagation of leucocytes. For this reason Stohr was able to demonstrate them in the respiratory region of the nasal mucous membrane in men as well as in animals.

There is, then, no reason for further explaining why I called the unpigmented elements which are here and there seen amidst the long, oval, and upward pointed cells *unpigmented cells*, and all the more so, as they had lost their pedicles. And yet, after all, my original opinion, that a part of the specimens might be artificial productions, was the more correct, for I have regarded as oval cells those which were actually the results of a post-mortem appearance.

For all these reasons I now recognize in the human olfactory mucous membrane, in addition to the supporting fibres, typical olfactory, and basal cells:

1. Genuine leucocytes, nine-pin shaped and oval, with hyaline contents, and resembling the transitional forms to which I will later return.

2. Cells which resemble leucocytes, but which in verifying preparations, and in a successful series of sections, prove to be *cellular elements with a pedicle*.

We find in perfectly perpendicular thin sections that we can recognize a pedicle. In this class belong the oval or conically inclined cells, which would seem to be *atypical* olfactory cells—*atypical* in that they exhibit a direct subdivision of nuclei, something not yet seen in my experience in the typical olfactory cells. But such an opinion can only be maintained when we can succeed in connecting their basal terminations with those of the olfactory nerve. Such a proof has been demonstrated concerning the genuine olfactory cells, but not, so far, of the atypical cells, as I call them.

Finally, the atypical cells have been seen not only in well developed, but in atrophic olfactory mucous membrane, and similar cells have been described in the respiratory nasal mucosa.

3. Transition cells from the pigmented "*bell cells*." These belong to those elements that have not hitherto been distinctly described, and have a small amount of pigmentation and hyaloid contents. Their position near the pigmented bells, and the change of position in their nuclei, remove any doubt of their also being cells without a pedicle. So far I have never seen this form except in a case of diabetes mellitus, and I leave it an open question whether they are normal or pathological, although I must insist that they are seen both in well developed and atrophic olfactory mucous membrane.

4. Distinctly pigmented, round, long, or transversely oval cells, *i.e.*, pigmented bells with a pedicle, seen everywhere in the epithelium. When oval their longitudinal axis is generally parallel to the longitudinal axis of the rest of the epithelial cells. The nucleus may be at any part of the cell. These I call migratory cells, an opinion with which most authorities agree, though some think that they are not solely migratory. There are only a few cells on the surface, but they may have been washed away by the secretions of Bowman's glands.

v. Brunn estimates the proportion of pigmented bell cells in comparison with the rest at about ten per cent., but, in my opinion, they vary greatly. I have often seen as many as fifty per cent. in well preserved sections from people who had enjoyed keen sense of smell.

The variations in the development of the zone of olfactory cells, at different ages, and their disappearance in primary atrophy of the olfactory mucous membrane seem to have escaped many observers in this field of investigation. Possibly they have regarded the zones of primary atrophy as respiratory epithelium, or as one observer says he saw pigment not only in the epithelial cells of the olfactory region, but in the ciliated cells. But I insist that outside of the region covered with olfactory epithelium in the new-born,

i. e., as far down as the lower border of the inferior turbinated bone, I have never found any pigmented epithelial or ciliated cells.

In following down the successive thinning of the zone of olfactory epithelial cells, the supporting cells remaining of the same thickness, I was led to the idea of the specific nature of the olfactory cells. The presence of pigmented bell-shaped cells and the simultaneous absence of the olfactory cells support the diagnosis of atrophic olfactory epithelium. Further aid comes from the absence of the basal membrane of olfactory fibres and of Bowman's glands.

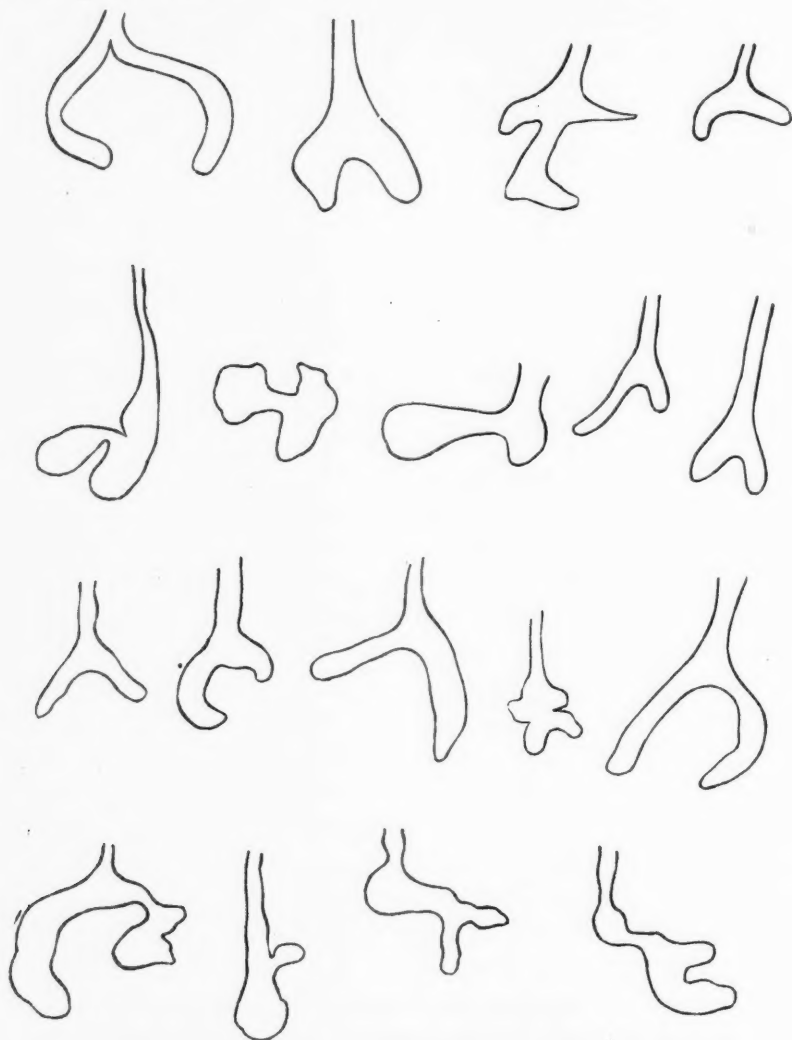
Some observers completely ignore primary atrophy of the olfactory epithelium and regard as a morbid process that which is perfectly normal, in other words, the bags of Bowman's glands.

A systematic microscopic examination of acute and chronic catarrh of the nasal mucosa carried on for the past five years proves to my satisfaction that alterations in the epithelium may go on independent of those in the tunica propria, *though they may exist together*. Thus we often find alterations in the epithelium with an intact tunica propria or a normal epithelium beneath which is œdema of the connective tissue and catarrh of Bowman's glands. Again, I have learned from study of acute inflammation of the mucosa of the nostrils, that together with œdema of the tunica propria we may have pronounced enlargement of Bowman's glands, at one time with mucous and cellular contents and at another without.¹ Even the absence of contents has not hindered me from diagnosing a pathological cystoid enlargement of Bowman's glands, since I know that in a semi-normal nasal mucous membrane Bowman's glands resemble those in a *healthy* animal—*i. e.*, *not thus enlarged*, and that, on the contrary, even when the contents are absent, this enlargement might be due to gas-forming microbes. Such air cysts have been seen in the vagina and in nasal polypi. Why should not then such gas-forming fungi reach Bowman's glands and enlarge them under pathological

¹ Bowman's glands often react to disturbances of circulation and respiration of a very brief duration.

conditions, when we know that in the nostrils we have the home for a complete Flora of microbes!!

As the subjoined sketches show, mostly two glandular tubes are united into one canal of exit lying just beneath the epithelium.



Schematic representation of Bowman's Tubular Glands from the healthy Tunica Propria of the Olfactory Region of a Woman of Thirty who died of Diabetic Coma.

The mutual relation between glands and adenoid tissue can only be correctly judged when, bearing in mind the rela-

tion between infant and animal, we compare the normal and pathological anatomy of the olfactory region in children and adults. According to this, in infants, the tunica propria is provided with glands, olfactory fibres and vessels, and all the structures are united with a thin adenoid tissue. In the early years of childhood the lymphatic tissue increases in amount, surpasses that of the slower-growing glands, and we find germ-centres in ovoid or nine-pin-shape form. In the course of years up to thirty the germ layer collapses. Then we find in the tunica propria of the olfactory region olfactory fibres, blood- and lymph-vessels, and lines of pigment all bound together with a fine network of connective tissue with a few leucocytes. When the conditions are normal (a rarity in the nasal mucosa of adults) it is impossible to say that the amount of adenoid tissue equals that of the respiratory region. But in morbid conditions, such as congestion, hypertrophic nasal catarrh, ozæna in the early stages, etc., the lymphatic tissue is by far the more predominant.

The irregular manner in which the olfactory epithelium is expanded over the interior of the nostrils, is not surprising, when we recall the extreme variety in the structure of the nasal cavities (septal deviation and the various configurations of the turbinated bones, etc.). For these reasons the path for the passage of air will vary in each patient, and the irritating foreign bodies which penetrate the nose will always fall on the same portions of the respiratory and olfactory regions. In catarrhal conditions, we shall first meet with congestion of the secretion where the exit of mucus has been prevented or obstructed by the abnormities of the shape of the nostril.

In regard to the olfactory hairs I would say that unlike some observers I have never been able to obtain a good view of them in any of my sections.

The acinous and occasionally the tubular glands exhibit a formation of chalk in guttate or glandular form.

A PECULIAR CASE OF SO-CALLED BEZOLD'S MASTOIDITIS.

BY DR. W. VULPIUS, OF NEW YORK,
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CASES of mastoiditis in which the pus, imprisoned in the mastoid antrum and cells, seeks an outlet by perforating the medial wall of the tip of the mastoid process, and passes from the incisura mastoidea beneath the muscles, whose attachments surround the outer and inferior surface of that tip, forming a deep-lying abscess, which burrows along the deep fasciæ of the neck or the sheath of the great vessels and nerves—I say, cases of this kind are not so rare either in practice or as recorded in literature, as to justify the publication of a single one unless it presents some peculiar and instructive features.

Strangely and unjustly, this form of mastoiditis has been baptized in the name of Prof. Bezold, who, in No. 18 of the *Deutsche medicinische Wochenschrift* (1881), published a paper which, by its inscription, indeed assumed to point out a new way on which a suppuration might, from the cavities of the middle ear, extend into the neighborhood. He ignored the fact that as early as in the year 1847 already Kuh and 1872 Böke had demonstrated that way by pathological specimens of carious petrous bones, and that Prof. Schwartze had recorded operations of such cases before.

It has been observed by different authors that the alleged form of mastoiditis almost exclusively occurs in consequence of acute otitis media, and prevalently in elderly persons, where, it is suggested, the more developed cellular structure

of the tip of the mastoid portion favors the propagation of the purulent process in a downward direction.

Our case was that of a young woman of twenty-eight years of age, who, on the 5th of May, 1893, presented herself in the dispensary of the New York Ophthalmic and Aural Institute with a running and lately aching left ear. She had not cared much about the discharge, which nine days ago had relieved her from a very severe earache lasting for two nights and one day, but resorted to medical help only when the pains recurred. Inspection showed, after the careful removal of a moderate creamy discharge from the auditory canal, a congested, bulging drum-membrane with a small perforation in the middle of the posterior half, with a pulsating reflex. The mastoid portion was tender and slightly oedematous.

After instilling some drops of cocaine, I immediately enlarged the perforation with a paracentesis needle, liberating a considerable quantity of pus, and ordered the patient to cleanse her ear and make cold applications behind it. This gave relief for a few days, but on the 8th the incision, which from the beginning did not gape, was closed again, and the same symptoms of pus-retention recurred.

I then proceeded to establish a more thorough and prolonged drainage by making under ether-narcosis a galvano-caustic paracentesis. I used for that purpose an instrument with a rather long platinum-wire loop, bent to form a blunt point, as originally devised by Dr. Jacoby, of Breslau. The effect of this paracentesis was still more unsatisfactory than that of the first, for, by the faulty construction of the galvano-caustic burner, singeing of the walls of the auditory canal as well as of the neighboring parts of the drum-membrane was inevitable, and the former being by nature rather narrow, the swelling of its integuments, which did not abate before some days, caused an obstruction hardly less considerable than the original narrowness of the perforation.

So, when on the 13th of May I repeated the last operation with an improved instrument and a very satisfactory result as establishing a free drainage of the tympanic cavity by a sufficiently large, round, and sharp-edged perforation without swelling of the adjacent parts, the mastoid inflammation had in the meantime proceeded and by the 14th developed into a well circumscribed, distinctly fluctuating swelling over the typical point for

mastoid abscess, viz., behind the auricle at the height of the upper wall of the auditory canal. No symptoms whatever pointed to the escape of pus from any other place of the mastoid.

Therefore on the fifteenth the typical mastoid operation after Schwartz was performed, evacuating a great deal of pus from the subperiosteal surface as well as from the mastoid antrum, which was struck by the gouge in a depth of about 7 mm from the bone surface, but showing no macroscopic communication of these two deposits of pus through the separating bony wall. Following the valuable advice of Schwartz, not to be contented with picking or boring a small hole for drainage into the carious cavity, but to lay it entirely open by chiselling off all the undermined bone, I was led by the probe downwards to the tip of the mastoid and actually found an opening there through which on pressure upon the side of the neck a great quantity of thick pus welled up. It came from a big abscess-cavity burrowed very deeply under the sterno-cleido-mastoid and splenius capitis muscles, extending posteriorly nearly to the median line of the nape of the neck.

This cavity, which was coated with a viscid abscess membrane, and the carious bone cavity, filled with soft granulation tissue, were scraped out and at the lowest point of the former a counter opening was cut for the insertion of a thick wick of sterilized gauze.

The first dressing was changed after five days; the second four days later. Granulations sprung up very slowly, the healing of the wound proceeded quickly after the second week and was complete five weeks after the day of the operation.

The discharge from the meatus decreased quickly and stopped entirely in about a week after the last paracentesis; one week and a half later the galvano-caustic opening was closed, and when I saw the patient for the last time—six weeks after the operation—the hearing on the operated ear was nearly normal.

I need not sum up what accounts for the diagnostical and clinical interest of the case. Mixed cases of abscesses behind and below the ear in consequence of mastoiditis have been recorded by Bezold as well as by other authors; but it is very rare that in such cases no symptoms point to the by far more serious of the two complications, and that the latter could only be detected during the course and rational extension of the operation.

I return now to what with regard to the prevention of such complications our case may teach us.

I agree with Dr. Sexton that a great many mastoid complications may be prevented by establishing a free drainage of the drum-cavity in acute or chronic middle-ear suppurations, even if I am not at all of his opinion, that all such complications—if once present—ought merely to be treated by the way of the drum, to refute which theory nobody could give more striking examples than Dr. Sexton himself does in his book, *The Ear and its Diseases* (see for instance case 5, page 295; and case 1, page 314). There are two possible ways in which acute middle-ear suppurations may become complicated by mastoiditis: either the same infective process invades simultaneously with the mucous membrane of the drum that of the mastoid cells and antrum—many of the influenza cases of mastoiditis seem to be based on such extensive primary infection, and here the mastoiditis was sometimes previously and more intensely developed than the drum inflammation; or the drum-membrane is either individually or by a special form of inflammatory infiltration so dense and resistible that it does not give way but to a very high pressure from the side of the imprisoned pus, and even then maintains by the narrowness of the effected perforation a constant tension which is liable to force infective material into the remoter cavities of the mastoid.

In the latter division of cases timely paracentesis of sufficient drainage power will prevent the mastoid complication. But the same dense and solid character, which did not admit of a sufficient natural drainage, will greatly restrict the efficiency of an incised perforation. In such membranes there is no elasticity to draw the edges of a cut asunder and change it into a gaping opening. These edges, therefore, remaining in permanent apposition are quickly (sometimes in less than a day) reunited, and so the *status quo ante* is restored.

In such cases only the galvano-caustic paracentesis gives the possibility of a sufficiently free and lasting drainage, but the instruments commonly used for that purpose are by no means so perfect as they ought to be for an operation in the

depth of a narrow canal with very irritable walls. This evidently being the reason for the still too limited application of the galvano-cautery in aural surgery. I beg briefly to point out the principles for the rational construction of galvano-caustic ear-instruments, and give a description of the one which I now use to my complete satisfaction for the alleged purpose.

The shanks of galvano-caustic ear-instruments ought to be made of the best conducting metals, copper or silver, so that, notwithstanding their necessary slimness, the greatest possible difference of conductive power between them and the platinum end-piece may be preserved. This permits the use of an electric current, weak enough not to heat those shanks to any harmful degree, but strong enough to produce a quick and bright glow of the platinum part. The latter ought to be as short as possible, so that the glowing takes place only at the point where it is immediately needed and does not extend through any length of the auditory canal. It should be of such a shape as to glow, with the least possible loss of heat by irradiation, most instantaneously, if the circuit is closed, and as to produce by one short glow a sufficiently large perforation.

All these conditions are best fulfilled by round platinum-wire, as being the most compact form, in comparison with flattened or dome-shaped pieces, which concurrently with their augmented surface favor injurious radiation, and at the same time lessen thereby the concentration of the glowing effect.

In the author's instrument a narrow and short platinum-wire (of 0.4 *mm* diam.) loop at the end of the slender, varnished, copper or silver shanks (of 1.0 *mm* diam.) is doubled on itself to form a shallow hook, whose foremost part, brought in contact with the drum-membrane, covers a sufficient area for a good-sized perforation by once sinking it quickly through the membrane.

In cases, where the operation is indicated by the rigidity of the drum-membrane, the latter is generally not very sensitive, and if by instillation of some drops of cocaine (10% sol.) it can be made to bear the blunt, cold point of the

galvano-caustic burner put on it with a slight pressure, no other anæsthetic for making the paracentesis is required. The action is so instantaneous that the ensuing pain hardly is felt before it is done ; after the quick withdrawal of the instrument from the meatus, one should never fail to expel by blowing into the ear the hot vapors produced by the glow heat from the moist tissue.

It gives a characteristic sensation if the instrument, which rested on the drum-membrane, breaks through as soon as it is made to glow ; and, if this sensation of irruption is felt, no further evidence of the effectiveness of the operation is needed, even if immediately afterwards the slough does not yet permit of a clear view of the perforation. The slough is generally shed off after some hours or a day, and then the drum-membrane shows a clean, round, sharp-edged hole, which perfectly answers the required drainage.

AN UNUSUAL CASE OF BILATERAL FRACTURE OF THE TEMPORAL BONE.

BY DR. W. VULPIUS, NEW YORK.

On the 23d of January, 1893, a working man forty-five years of age came into the dispensary of the New York Ophthalmic and Aural Institute to seek relief for deafness and annoying noises in his right ear. These troubles were the consequences of an accident, whose history is the following: On the 28th of November last year the patient was occupied in throwing timber down into a cellar, over which he was standing on a plank. Suddenly the latter broke, and the man tumbled about twelve feet into the cellar, striking the floor with his head. When he recovered from an unconsciousness of indeterminable time, he noticed that his nose and mouth were bleeding, but could not remember anything definite about his ears. Being unable to rise, he was carried to Bellevue Hospital, and obliged to stay in bed for two weeks and a half. During this time he suffered from severe headache and felt very dizzy; his right eye was closed by a swelling, and there was a wound at the back of the right auricle near its upper attachment. The dizziness abated very slowly, so that even at the time of his presentation in the Dispensary he was obliged to use a cane for taking any long walk. The clinical examination showed the right auditory canal perfectly clean, the membrana tympani nearly normal in its appearance and even more delicate and transparent than could be expected, so that the long process of the incus could be distinctly seen; the translucent promontory wall below the oval window had not its common yellowish-white color, but showed—especially by diffuse daylight—a tinge of pink.

The deafness was very considerable; when the left ear was tightly closed, only words shouted close to the right one, or spoken

loud and plainly through a conversation tube, were understood. Tuning-forks of different pitch were not heard either by bone-conduction from the forehead or the mastoid process, or by air-conduction, when the prongs were held near the right meatus.

The left auditory canal was almost entirely filled with what on inspection seemed a plug of impacted cerumen, but after its removal proved to be most of it a hard and solid clot of inspissated blood. The blood had most probably issued from a point in the upper wall of the auditory canal quite near the posterior circumference of the tympanic ring, where some marks of the hemorrhage were still visible. The left drum-membrane, too, was uninjured, it looked a little duller than the right one, but cleared up perfectly during the following weeks of observation. The hearing on this side was only little impaired; whispered words were heard at a distance of eighteen to twenty feet. The tuning-fork examination gave no constant and reliable result.

Besides this ear affection there was facial paralysis of the right side extending to every twig of the nerve. The patient was unable either to frown his forehead or to close his right eye; the cheek flapped loosely, the upper lip could not be raised, nor the mouth pointed for whistling; smiling drew the lips to the left side, and the right angle of the mouth was lowered. All facial muscles of the right side showed the characteristic electrical reaction of degeneration, which indicated a peripheric lesion of the nerve; but there was another symptom which allowed even a closer localization, viz., the loss of taste at the anterior part of the right side of the tongue, which pointed to a simultaneous lesion of the chorda tympani, so that the fracture of the temporal bone on the right side had likely passed between the origin of the large petrosal nerve and the branching off of the chorda, probably involving the oval window.

So the peculiarities of the case were: first, that there was no evidence of any bleeding having taken place from the ear on the prevalently affected right side, while on the left side there was a blood-clot and local marks of ear-bleeding even after some weeks, so that one could be induced to think of that escape of blood into the outer meatus having acted like a safety-valve for the labyrinthine organs and the facial nerve, which on the right side were exposed to the injurious pressure of an imprisoned hemorrhage.

Second: that the complication of the traumatic deafness with

a total paralysis of the facial nerve and the chorda admitted a more precise localization of the fracture on the right side, than can be made in most cases of this kind.

On the 27th of September, 1880, Dr. Buck of this city read a paper on the fractures of the temporal bone before the New York County Medical Society, to whose propositions the above said peculiarities put my case into an immediate reference.

As to the diagnostic significance of hemorrhage from the ear, Dr. Buck quoted in his paper from Prescott Hewett's article on fractures of the base of the skull: "that with a serious bleeding from the ear continuing some time a fracture of the temporal bone may be safely diagnosed." He stated then the necessity of a fresh study of this whole subject of fractures of the temporal bone, because the clinical observations hitherto made lack records of a thorough aural examination, and added to the propositions given by Hewett, the following: "When a fall or blow upon the head is followed by bleeding from the ear, no matter how trivial, we may diagnose a fracture of the temporal bone in the neighborhood of Shrapnell's membrane, and probably in the line of the Glaserian fissure." This would justify the diagnosis of the bilateral fracture in our case, even if the clinical interest was by the grave symptoms of deafness and facial paralysis concentrated to the right side.

Dr. Buck continues further: "The necessity of such examinations is shown very clearly in those cases of fracture in which no outwardly visible hemorrhage or other discharge takes place from the ear," a combination, of which he had himself no opportunity of making a clinical observation, but for the illustration of which he gives the history of a case, which was treated and died in the New York Hospital, and of which Dr. Peabody made the post-mortem examination. A literary review of records of similar cases of fracture of the temporal bone shows that concurrently with Dr. Buck's statement most of them are viewed from a surgical standpoint and lack an early and thorough aural examination;

one series was published by Dr. Bernhardt in vol. vi. of the *Archiv für Psychiatrie* to refute the significance of the so-called paradoxical galvanic reaction of the auditory nerve, which was first demonstrated and put stress on by Brenner.

In the same year (1876) Dr. Kétli of Budapest published a case of great interest on account of the extent of its lesions; there were paralyzed both abducent, aural, and facial nerves with the chordæ.

Many other records are scattered in the medical periodicals and in hand-books, but as Dr. Buck's demand of a revision of the subject from an otological standpoint stands valid even now after a thirteen years' interval, I am glad to be able to contribute to the fulfilment of this demand by the communication of the above detailed case.

A CASE OF REMOVAL OF THE STAPES.¹

BY PROF. FRIEDR. BEZOLD, MUNICH.

Translated by Dr. WARD A. HOLDEN, New York.

IT is of prime importance, for our knowledge of the conducting apparatus, to know how much the ear is capable of hearing after removal of particular portions.

Long before the malleus and incus had been removed by operation, we were aware that a considerable amount of hearing might exist with only the stapes present. And at times the entire region of the pelvis ovalis lies bare, neither the head nor the crura of the stapes being visible, while a whisper can still be heard at several metres' distance. In such cases we assume that at least the foot-plate of the stapes and the annular ligament are intact, and it might be supposed that the foot-plate impinging on the annular ligament had a function in receiving impulses and particularly sound waves similar to that of the large otolith found in the lower animals.

In all these cases of disturbance in the conducting apparatus, besides the relative functional defect shown in the decrease in hearing distance, there is also an absolute defect shown in the absence of perception of the lower portion of the tone-scale by air-conduction, while the bone-conduction for the lower tones is increased.

These questions have a particular interest at present on account of the latest reports from the United States showing the beneficial effect on the hearing from the operative removal of the stapes.

Up to this time most otologists, notwithstanding some reports in the literature to the contrary, have agreed with

¹ Read at the second meeting of the German Otological Society.

Toynbee's opinion that with the loss of the stapes the hearing is abolished. Several autopsies of cases of tubercular purulent otitis with detachment of the stapes, and a case in which the foot-plate was replaced by cicatricial tissue, all being totally deaf in life, led me also to the same opinion.

Ludewig¹ removed the stapes twice, but in one case the hearing was not reported; Grunert² in one case obtained an improvement, a whisper being heard at 1 m, whereas before it was heard only at $\frac{1}{2}$ m. Since then three cases have been operated in Schwartze's clinic. Of the six cases, deafness resulted in one, in two the test of hearing was not reliable, and in three there was an improvement later. The hearing of the unoperated ear was not reported in these cases.

I come now to Jack's reports from a reference in the *Monatschr. f. Ohrenh.*, 1892, No. 77. We learn that in the course of a few weeks he removed the stapes in seventeen cases, two with otorrhœa, others in which an otorrhœa had run its course, and others pure cases of sclerosis. Once a small portion of the foot-plate remained, in another case the crura were but partially removed while the foot-plate remained in position. Yet in all seventeen cases he obtained a marked improvement in hearing, particularly for the voice, which lasted through the four months that the cases were under observation. The reaction was always slight. In one case of total deafness, the day following the operation a whisper was heard at seven feet.

Blake (*Boston Med. and Surg. Journ.*, Dec. 8, 1892) also reported two cases of removal of the stapes in old sclerosis. In the first case the crura broke off and the foot-plate remained. Galton's whistle was heard better. In the second case the entire stapes was removed. No report is given of the hearing.

After reading these reports it would appear that in chronic obstructions of the conducting apparatus it is only necessary to remove the stapes in order to obtain a certain improvement in hearing. The question of the amount of hearing retained after removal of the stapes seemed to me so im-

¹ *Arch. f. Ohrenheilk.*, xxix., p. 261, and xxxi., p. 228.

² *Ibid.*, xxxiii., pp. 219, 222, 236.

portant both in its physiological and its practical aspects that I was persuaded to make the operation in at least one case, the history of which is as follows:

Mrs. K., æt. forty-eight, suffered from hardness of hearing for years, with constant tinnitus for a year. In both ears there are the results of purulent otitis media, with persistent perforation: R, a kidney-shaped perforation in the posterior upper third of the *Mt.* The malleus handle is adherent to the promontory, the long process of the incus and the stapedius tendon lie free; the niche of the fenestra rotunda is also visible. The mucous membrane is of a pale yellow color. Clear perforation sound. L, a depressed cicatrix at the posterior periphery with a small perforation through which the air passes freely in Politzerization.

		Whisper	Ordinary conversation
	Right	2 cm	20 cm
	Left	10 cm	90 cm
	Lower tone-limit	Upper tone-limit	Rinne
Right	C(64)	Galton 1.7	— 7 sec.
Left	A(110)	Galton 2.3	— 5 sec.

A on the vertex, hearing ear not determinable, + 12 sec.

a' on the vertex, hearing ear not determinable, — 2 sec.

Extraction of the stapes was done on the right, poorer ear. After cutting the stapedius tendon and trying to disarticulate the inco-stapedial articulation, an attempt was made to remove the stapes with various hooks. This not being successful the head was seized with a fine forceps and the entire stapes removed by gentle traction. There was no escape of serum. The mucous membrane adhered to the head and the crura of the stapes, while the inner surface of the foot-plate was of a bony-white color. This would indicate that not only the periosteum, but also the cartilaginous structure covering the foot-plate, had remained.

The operation was done under cocaine and was not painful. At the moment of removal the patient sank on the other side with a sigh and became pale. She retained consciousness. On account of the relaxed condition of the patient, tests of the hearing at that time were unreliable.

The excessive giddiness lasted three days. She then complained of tinnitus. Whisper not heard in the right ear, ordinary conversation uncertain, not better with the right ear open than

with both closed. Only the forks c^4 and f^4 were heard by air-conduction, and the other ear could not be excluded with certainty from perception. The A fork on the vertex was referred to the operated ear.

The ear remained dry. The dizziness lasted three weeks. There was continuous tinnitus but chiefly in the unoperated ear.

Examination at this time showed that a whisper was not heard, loud conversation was heard near the ear, many numbers incorrectly. Lower tone-limit for air-conduction fork A, from this up all forks and whistles heard to the upper limit 2.3 Galton.

The last examination, made ten weeks after the extraction, shows the mucous membrane of the tympanum pale and dry, in the region of the stapes an irregular gray depression with numerous reflexes.

Conversation heard at 3 *cm*. The upper and lower tone-limits as before. Fork A on the vertex is perceived by the right ear and is heard 17 sec. longer; a' on the vertex is heard in the right ear and shortened 3 sec. Rinne $a'R - 10$, $L - 6$ sec.

The result of the operation for the first few days was absolute deafness. After three weeks some hearing returned, but remained always much less than before the operation.

This return of hearing I would explain by my previous theory that pressure on the membrane closing the fenestra ovalis may act favorably on the hearing. In our case, while this could not have been done by the foot-plate, it may have been produced by the thickened and ossifying cartilaginous structure. The same effect is got by the cotton pellet, which in my experience has improved the hearing only when it caused pressure in the region of the stapes.

It seems important to publish this case as soon as possible in order to warn others against unfavorable results. In cases which may be operated in the future it is desirable that the functional tests may be very carefully carried out and reported in full.

Blake has kindly informed me that in his two cases there was no permanent improvement, but in one a decrease from $\frac{12}{8}$ to $\frac{5}{8}$ for the fork. Ludewig has written me that he found deafness in six cases of unintentional extraction of the stapes.

REMOVAL OF THE STAPES.

By CLARENCE J. BLAKE, M.D.,

PROFESSOR OF OTOTOLOGY, HARVARD UNIVERSITY.

THE following cases are reported in continuance of the communication made in previous numbers of this journal as illustrating the results of attempted removal of the stapes in cases of chronic non-suppurative disease of the middle ear, and are selected from those which will be tabulated later, because they set forth certain points, both in the operation and in the symptoms attending it, which are of interest.

S. N. D., a man forty-five years of age, who, in consequence of chronic progressive thickening of the tympanic mucous membrane incident to a slight chronic naso-pharyngeal catarrh, had been steadily losing his hearing during a period of several years, applied for operation in the middle ear in the hope of obtaining some improvement. Upon examination on the day of operation, the left membrana tympani was found to be intact and of very nearly normal transparency. The Politzer acoumeter was not heard; the tuning-fork (562 v. s.) was also not heard aërially, and by bone-conduction over the left mastoid process only $\frac{3}{8}$. The voice was heard, but was not understood at a distance of one foot from the left ear, the right ear being tightly closed.

The preliminary incision in the membrana tympani was made opposite the round window without cocaine and continued upward for a distance of two millimetres, when, in consequence of the pain caused by the incision, it was necessary to make an application of a few drops of a ten-per-cent. solution, and as the patient was exceedingly nervous and dreaded the pain several applications became necessary. The opening in the membrana

tympani being completed the incudo-stapedial joint was plainly visible, and as there was no improvement in hearing consequent upon the opening in the membrana tympani it was decided to proceed further; the stapedius tendon was therefore divided, as was also the incudo-stapedial articulation, both of these manipulations being accompanied by a sensation to the patient of a rasping or scraping noise.

Attempted mobilization of the stapes showed that bone to be firmly fixed at its base, as a fine probe passed into the niche and around the stapes gave no evidence of merely superficial adhesions, and there was no improvement in hearing after slightly attempted mobilization.

Firm traction by means of a blunt hook passed under the head of the stapes from below resulted in a fracture of the anterior crus close to the head and of the posterior crus close to the base plate, this fracture being accompanied by a sensation to the patient of a sharp report.

Tests of the hearing made before, during, and after the operation showed it to be unchanged.

The opening in the membrana tympani was closed by a paper dressing, and at the end of five days had entirely healed.

As an illustration of the occasional effect of cocaine it may be stated that within five minutes after the operation the patient, who had been previously flushed, became pale, the pulse became slow, and there was first vertigo, then nausea and vomiting. These symptoms persisted for over an hour and had evidently, from the lapse of time between their appearance and the attempted mobilization of the stapes, no connection with any interference with that ossicle. Twenty-four hours after operation the patient was entirely free from the unpleasant symptoms referred to and had neither pain nor discomfort in the ear.

W. N., a man forty-eight years of age, whose hearing had been slowly decreasing in both ears for several years until conversation, except in the right ear and in a very loud tone of voice, had become impossible applied for operation. In both ears there was thickening of the tympanic mucous membrane in consequence of progressive chronic non-suppurative disease, and the hearing in the left ear was so far impaired that the Politzer acoumeter was not heard at all, and the tuning-fork (562 v. s.) was heard neither by aërial nor by bone-conduction over the mastoid. The left membrana tympani was very much depressed, the long process of the

malleus fore-shortened, and the posterior segment indrawn and tense, and the division of this segment in the course of the incision allowed the tensor tympani to draw the malleus still farther inward.

The patient was especially sensitive to pain, and the effect of the local application of cocaine in the progress of the peripheral incision passed off within two minutes, so that frequent applications were necessary. After the opening in the membrana tympani had been finally made the incudo-stapedial articulation was found to be plainly visible and the tympanic cavity quite deep. It was therefore decided to attempt the removal of the stapes without tenotomy of the stapedius and without dividing the incudo-stapedial joint. By means of a hook passed behind the long process of the incus gentle traction was first made and the hearing then tested; when it was found that the hearing for the tuning-fork, by bone-conduction over the mastoid, had risen from zero to $\frac{1}{6}$. Still further traction was then made in the same manner, the result being extraction of the stapes from the niche and outflow of fluid and a rupture of the incudo-stapedial articulation, the stapes being carried upward and backward by the pull of the stapedius muscle, and the incus also disappearing in the same direction.

Immediately after the operation the tuning-fork was not heard aërially, but the hearing for the fork had increased to $\frac{2}{3}$ by bone-conduction over the mastoid.

In this case it should be remarked that, notwithstanding the apprehension of the patient as to pain during, and other possible effects after, the operation, neither the mobilization of the stapes nor its final removal from the niche was accompanied either by slowing of the pulse or by vertigo; and a report made six weeks later was to the effect that the ear was, to all intents and purposes so far as the patient's sensations were concerned both as to hearing and as to tinnitus aurium, which still persisted, precisely the same.

The following cases, briefly reported, include those belonging to a class for which some operative relief, if possible, would be most desirable; cases in which, as has been shown by Politzer, there is, in consequence of a chronic progressive, long-continued, non-suppurative middle-ear disease, a fixation of the stapes, on account of bony growth, to the extent

in some cases of a complete enclosure of the base plate and even of the crura also.

L. S., a man twenty-six years of age, had, especially in the right ear, a slowly progressive impairment of hearing dating back, so far as the first observation of it was concerned, to a severe coryza twelve years previously. The right membrana tympani was transparent, intact, and not indrawn. The Politzer acoumeter was heard at a distance of 4"; the tuning-fork (562 v. s.), aërially $\frac{5}{8}$, by bone-conduction $\frac{3}{8}$.

The operation, under cocaine, consisted in the usual incision, which was made without improvement in the hearing. The stapedius tendon and the articulation were divided without special discomfort to the patient, and a blunt hook passed under the stapes head and used with gentle traction resulted in a fracture of the crura midway of their length; with this fracture there was a sensation of a sharp snapping noise, but there was neither pain, vertigo, nor change in the pulse, and the hearing was not improved.

N. B., a woman, twenty-eight years of age, was a case of the same class as those previously reported. The hearing had been slowly decreasing for several years until the deficiency had become a serious inconvenience in the attempt at hearing anything but loud conversation. The left ear was the more seriously affected of the two, and it was therefore the one selected for operation. The membrana tympani was fairly transparent, intact, and the hearing for the Politzer acoumeter was 6", for the tuning-fork (562 v. s.), aërially $\frac{1}{8}$, and by bone-conduction over the mastoid $\frac{3}{8}$. The usual incision in the membrana tympani was made under cocaine without improvement in the hearing. The stapes was high up and far back and the stapedius tendon was probably only partially divided, as, following division of the articulation, the use of the blunt hook resulted in extraction of the stapes from the oval window and its loss from the hook by being pulled upward and backward. With the extraction of the stapes there was no apparent outflow of fluid, but there was pallor, quickened respiration, and slowing of the pulse. There was no improvement in the hearing, either immediately after the operation, which was concluded with the application of a paper dressing, or at subsequent tests.

M. A., a woman, forty years of age, with a history similar to that in the above two cases, and with marked impairment of hearing

in the left ear ; the tuning-fork aërially (562 v. s.) being heard less than $\frac{5}{8}$, and by bone-conduction over the mastoid $\frac{1}{8}$.

Following the usual peripheral cut under cocaine, a division of the stapedius tendon and of the incudo-stapedial articulation, an attempt at mobilization of the stapes showed that bone to be very firmly fixed, while a still further persistence to the extent of attempted extraction, resulted in a fracture of the anterior crus near the head and of the posterior crus near the foot-plate.

There was no vertigo and no slowing of the pulse, neither was there any gain in the hearing from the operation, but the patient experienced during its progress the usual sensations of rasping and grating noises, and of a sharp crack coincident with the stapes fracture.

The two following cases are selected as illustrating the fixation of the stapes, to the extent of absolute immobility, in the course of a chronic non-suppurative disease of the middle ear. In both of them had greater force been used, a fracture of the head of the stapes or of both crura at their upper portions would probably have resulted ; and in one of them it was even possible to slightly lift the partially recumbent head of the patient by means of the blunt hook inserted under the head of the stapes.

Mrs. F. K., forty-five years of age. In both ears the hearing was much impaired, but more especially in the left. The Politzer acoumeter was heard only close to the auricle, the voice at a distance of $\frac{1}{8}$, the tuning-fork (562 v. s.), aërially $\frac{1}{8}$, and by bone-conduction over the mastoid $\frac{3}{8}$. The Konigs rods were reported to be heard up to the tone of 35,000 v. s., but, notwithstanding repeated tests, there was some doubt as to the accuracy of the patient's statement.

The operation under cocaine consisted, after the peripheral cut in the membrana tympani, of division of the stapedius tendon and of the incudo-stapedial articulation. The stapes was found to be immovable even upon forcible traction with a blunt hook, and the opening in the membrana tympani was therefore closed and the paper dressing applied.

There was no slowing of the pulse, no vertigo, and no improvement in the hearing, but the patient reported a lessening of the tinnitus aurium, which had previously been marked in that ear, which improvement, however, did not persist.

Miss L. T., fifty years of age. Also a case of slowly progressive impairment of hearing in consequence of chronic non-suppurative disease of the middle ear.

As the right ear was the worse of the two, both in regard to hearing and an annoying tinnitus aurium, it was the one selected for the operation, which was in all respects similar to that in the preceding case, and terminated in an application of the paper dressing.

There was during the progress of the operation neither vertigo nor slowing of the pulse, nor was there any gain in hearing, which, as tested before the operation, was found to be for the tuning-fork (562 v. s.), aërially $\frac{5}{8}$, and by bone-conduction over the mastoid $\frac{2}{3}$. The Politzer acoumeter was not heard at all. There was no improvement in the tinnitus.

In reviewing the cases reported in this paper in the four numbers of this journal in which they have appeared, and also the tabular list which is here appended, it is very evident, so far as conclusions can be drawn from a small number of cases, that the operation of the removal of the stapes does not answer the purpose which might be hoped from it in cases of chronic non-suppurative disease of the middle ear. This conclusion is one in which the clinical and operative observations are entirely in accord with the pathology of this class of cases as set forth by numerous observers, and, lastly and most clearly, by Politzer. For all this class of cases, therefore, I should, as the expression of a personal opinion and as the result of experience, advise an exploratory tympanotomy with local and without general anæsthesia, as a preliminary to, or as the first part of, an operation having in view any form of interference with the middle ear, from simple mobilization of the ossicular chain to the removal of the stapes.

The exploratory tympanotomy, especially where the incision is made, as it should be, close to the periphery of the membrana tympani and of sufficient extent, affords an opportunity for a better determination of the condition of the middle ear in chronic non-suppurative disease than can be obtained in any other way, and after the exploratory incision, if it seems advisable not to operate more extensively, the opening in the membrana tympani can be closed by a

simple paper dressing with the prospect of speedy healing. If, however, the exploratory operation and coincident tests show that it is advisable to perform an operation in the middle ear, whether synæchtomy, tenotomy, incudectomy, incudo-stapedectomy, or stapedectomy, the opening suffices for the purpose.

In the great majority of the cases of stapes fixation, consequent upon chronic non-suppurative disease of the middle ear, the operation, as seen by the tabular statement, was ineffectual so far as the removal of the stapes was concerned, the fixation or the base plate at least being such as to result in fracture of the crura instead of the removal of the ossicle entire. In all the cases of non-suppurative disease in which the stapes was extracted entire, the hearing was definitely and practically improved in one only; and of the two other cases in which definite improvement in hearing resulted from the operation there was one in which the mobilization of the base plate incident to the fracture of the crura gave an improvement in hearing for high tones, and for the voice in ordinary conversation only to the extent of about twenty per cent.

When we take into consideration the secondary changes which may have occurred in the internal ear in the course of a non-suppurative disease of the tympanum and the injury to the delicate structures in the labyrinth which might result from the force exerted in the extraction of the stapes, coupled with the inadequate results as set forth in the experience here tabulated, it may be justly said that the operation of stapedectomy does not afford a promising outlook for this class of cases.

So far as the cases of fixation of the stapes incident to suppurative disease of the middle ear is concerned, we have, to begin with, to deal with a different pathological condition; the changes which have effected the fixation of the stapes are, in the majority of the suppurative cases, more superficial and more readily amenable to surgical treatment than in the chronic non-suppurative cases, and, while the extraction of the stapes has undoubtedly effected a considerable degree of improvement in some of the suppurative cases, it does

not at all follow that the same, or at least sufficiently satisfactory, results could not have been obtained by the minor operations effecting a mobilization of the stapes or of the ossicular chain as a whole, and consequently maintaining that mobile condition by artificial means.

The subject is one which is still open for investigation on other lines as well as on those here indicated, and it will be only as the result of a long series of carefully conducted comparative observations by different investigators that the value of the operation of removal of the stapes can be given its proper place in aural surgery.

TABULAR STATEMENT OF TWENTY-TWO CASES OF STAPES OPERATION.

CONDITION.	TESTS BEFORE OPERATION.	CHARACTER OF OPERATION.	CONCOMITANT SYMPTOMS AND INCIDENTS.	RESULTS AND REMARKS.
I.—R. o. m. c. adh. <i>Mt</i> transparent, intact.	P. ac. 2". T. f. aer. $\frac{5}{8}$, on mastoid $\frac{3}{8}$. Voice 3'. Konig's rods 25,000 v. s.	November 5, 1892. Ether. Peripheral cut, incudo-stapedectomy, both bones allowed to remain in tympanum.	Slowing of pulse and pallor on extraction of stapes.	7 mos. later <i>Mt</i> reproduced, hearing stable. April 14, 1893. P. ac. 12". T. f. aer. $\frac{3}{8}$. Konig's rods 30,000 v. s.
II.—L. o. m. c. adh. <i>Mt</i> transparent, intact.	P. ac. o. T. f. aer. o, on mastoid slightly if at all. Voice loud close to head heard only not understood.	November, 1892. Ether. Peripheral cut, division of tendon and articulation, stapes removed entire.	Slowing of pulse, flow of fluid from niche, no vertigo for two days, then began, increased, became severe, lasted 10 days.	No gain in hearing, slight vertigo and unsteadiness in walking one month later.
III.—L. o. m. c. adh. Progressive 36 years. <i>Mt</i> slightly opaque, intact.	P. ac. 4". T. f. aer. $\frac{1}{8}$, on mastoid questionable Konig's rods 20,000 v. s.	November 21, 1892. Ether. Peripheral cut, division of tendon and articulation, fracture of stapes, anterior crus close to foot-plate, posterior crus close to head, circumcision and attempt at removal.	No slowing of pulse until attempt to extract base plate, then also slight oozing of watery fluid. No vertigo.	December 5, 1892. P. ac. 5". T. f. aer. $\frac{1}{8}$, on mastoid $\frac{3}{8}$. Konig's rods 25,000 v. s.
IV.—L. o. m. c. adh. with thick periph. <i>Mt</i> intact.	P. ac. c't. T. f. aer. $\frac{3}{8}$, on mastoid $\frac{3}{8}$. Galton's whistle o. Konig's rods 20,000 v. s. Voice c't., conversation tone.	November 23, 1892. Cocaine. Peripheral cut, division of tendon, and articulation, fracture of stapes, both crura close to foot-plate, paper dressing.	Attempt at circumcision and removal showed a bony ankylosis and foot-plate was left in place.	November 28, 1892. T. f. aer. $\frac{3}{8}$, on mastoid $\frac{3}{8}$, voice, low tones, clearly close to ear November 29th. Galton's whistle 50, and T. f. 1. 2. heard L. (not before). February 4, 1893. T. f. aer. $\frac{1}{8}$, and for voice (temporary gain from mobilization of foot-plate).

CONDITION.	TESTS BEFORE OPERATION.	CHARACTER OF OPERATION.	CONCOMITANT SYMPTOMS AND INCIDENTS.	RESULTS AND REMARKS.
V.—L. o. m. c. adh. progressive, especially thick about stapes, <i>Mt</i> opaque, indrawn.	P. ac. 2". T. f. aër. $\frac{5}{8}$, on mastoid $\frac{10}{8}$.	December 16, 1892. Cocaine. Peripheral cut, division of articulation but not of tendon, stapes extracted entire, paper dressing.	Suction sensation, slowing of pulse, transient vertigo, outflow of fluid from niche.	No appreciable gain in hearing.
VI.—R. eff. o. m. s. <i>Mt</i> destroyed, incus gone, stapes free from muscular or other attachment plainly visible.	P. ac. o. T. f. aër. o, on mastoid $\frac{30}{8}$.	December 30, 1892. No anæsthetic. Stapes extracted by gentle traction made with blunt hook.	Suction sensation, pallor, slowing of pulse, slight blush of tympanic mucous membrane followed by outflow of fluid and vertigo.	Gain for hearing at first very marked for voice, then variable, and then disappearing in the next ten days with the stoppage of the flow of the fluid and the subsidence of the vertigo.
VII.—R. o. m. c. adh. of long standing, <i>Mt</i> transparent intact.	P. ac. 1". T. f. $\frac{1}{8}$, on mastoid $\frac{5}{8}$. Galton's whistle lower third only. Voice c't.	December 2, 1892. Cocaine. Peripheral cut, division of tendon, incudo-stapedectomy, paper dressing.	Slight vertigo, pulse increased (80-100) and became small.	No gain in hearing, subsequent decrease.
VIII.—L. o. m. c. adh. <i>Mt</i> transparent, intact.	P. ac. o. T. f. aër. $\frac{5}{8}$, on mastoid $\frac{30}{8}$. Konig's rods 35,000 v. s.	January 13, 1893. Cocaine. Peripheral cut, division of articulation, but not of stapedius tendon, extraction of stapes, Paper dressing.	On extraction of stapes, sense of shock, slowing of pulse, no vertigo, no apparent fluid from niche.	May 18, 1893. P. ac. o. T. f. aër. $\frac{3}{8}$, on mastoid $\frac{25}{8}$. Konig's rods 20,000 v. s. only.
IX.—L. o. m. c. adh. progressive, of long standing, local treatment ineffectual. <i>Mt</i> clear, intact.	P. ac. o. T. f. aër. $\frac{0}{8}$, on mastoid questionable, or referred to R. Galton's whistle full limit, Konig's rods 30,000 v. s.	January 20, 1893. Cocaine. Peripheral cut, division of articulation, mobilization of stapes, then extraction of stapes entire, paper dressing.	On extraction of stapes from niche a loud subjective sound, no pain, no vertigo, slight outflow of fluid, immediate increase in hearing for all low tones which disappeared within 48 hours.	June 17, 1893. P. ac. o. T. f. aër. $\frac{0}{8}$, on mastoid referred to R. Galton's whistle apparently at full limit and Konig's rods apparently up to 20,000 v. s. (Weber T. f. in front of aural line referred to L. back of line to R.)
X.—R. o. m. c. adh. <i>Mt</i> clear and transparent.	P. ac. c't. T. f. aër. $\frac{1}{8}$, on mastoid $\frac{3}{8}$.	January 26, 1893. Cocaine. Peripheral cut, division of tendon and articulation, fracture of cura at mid length, paper dressing.	Sound of a sharp crack on fracture of stapes, no slowing of pulse, no vertigo.	February 24, 1893. P. ac. o. T. f. aër. $\frac{5}{8}$, on mastoid $\frac{25}{8}$. Voice with a metal trumpet as sharp as before the operation.

CONDITION.	TESTS BEFORE OPERATION.	CHARACTER OF OPERATION.	CONCOMITANT SYMPTOMS AND INCIDENTS.	RESULTS AND REMARKS.
XI.—L. o. m. c. adh. <i>Mt</i> transparent, intact.	P. ac. c't. T. f. aër. $\frac{15}{85}$, on mastoid $\frac{20}{85}$.	February 9, 1893. Cocaine. Peripheral cut, division of articulation but not of stapedius tendon, fracture of both crura near base plate of stapes.	Fracture of crura, preceded by slight sense of suction resistance, and followed immediately by vertigo, unconsciousness and nausea, lasting over an hour, and a momentary change in the pulse, which became small and rapid (112).	February 27, 1893. P. ac. c't. T. f. aër. $\frac{20}{85}$, on mastoid $\frac{20}{85}$. Vertigo persists.
XII.—R. o. m. c. adh. posterior segment opaque and relaxed.	P. ac. o. T. f. aër. $\frac{15}{85}$, on mastoid $\frac{20}{85}$. Galton's whistle o.	March 30, 1893. Cocaine. Peripheral cut, division of articulation, fracture of both crura of stapes midway of length, paper dressing.	No pain, no vertigo, no change in pulse.	June 21, 1893. P. ac. o. T. f. aër. $\frac{0}{85}$, on mastoid $\frac{15}{85}$. No gain in hearing.
XIII.—B. o. m. c. adh. especially L. <i>Mt</i> clear, intact.	L. P. ac. o. T. f. aër. o, on mastoid o. Galton's whistle 30 only.	Cocaine. Peripheral cut, incudo-stapedectomy without division of articulation or tendon, paper dressing.	On extraction of stapes, slowing of pulse, no vertigo.	After opening of tympanum, T. f. aër. o, on mastoid $\frac{10}{85}$; after extraction of stapes, T. f. aër. o, on mastoid $\frac{25}{85}$; outflow of fluid from niche. No subsequent improvement.
XIV.—L. o. m. c. adh. <i>Mt</i> transparent, intact.	P. ac. c't. T. f. aër. o, on mastoid $\frac{20}{85}$.	Cocaine. Peripheral cut, division of tendon and articulation, stapes, anterior crus close to head, posterior crus close to base plate, paper dressing.	No vertigo, no slowing of pulse, but nausea and vomiting, apparently due to cocaine. No gain in hearing.	
XV.—L. o. m. c. adh. <i>Mt</i> transparent, intact.	P. ac. c't. T. f. aër. $\frac{15}{85}$, on mastoid $\frac{25}{85}$. Voice $\frac{1}{80}$. König's rods 35,000 v. s.	Cocaine. Peripheral cut, division of tendon and articulation, stapes immovable, paper dressing.	No slowing of pulse.	No improvement in hearing, and tinnitus, which was at first reported decreased, subsequently returned.
XVI.—R. o. m. c. adh. <i>Mt</i> clear.	March 6, 1893. P. ac. o. T. f. aër. $\frac{5}{85}$, on mastoid $\frac{20}{85}$.	Cocaine. Peripheral cut, division of muscle and articulation, stapes immovable, paper dressing.	No vertigo, no slowing of pulse.	No gain in hearing.

CONDITION.	TESTS BEFORE OPERATION.	CHARACTER OF OPERATION.	CONCOMITANT SYMPTOMS AND INCIDENTS.	RESULTS AND REMARKS.
XVII.—R. o. m. c. adh. <i>Mt</i> transparent, intact.	April 29, 1893. P.ac. 4". T.f. aër. $\frac{5}{8}$, on mastoid $\frac{20}{85}$.	Cocaine. Peripheral cut, division of articulation and tendon, fracture of stapes both crura midway, paper dressing.	No pain, no vertigo, no change in pulse.	No gain in hearing.
XVIII.—L. o. c. m. c. <i>Mt</i> thickened and opaque.	May 20, 1893. P.ac. c't. T.f. aër. $\frac{10}{85}$, on mastoid $\frac{20}{85}$. Voice 2 ft. Galton's whistle 60, deep rushing tinnitus.	Cocaine. Peripheral cut, division of tendon and articulation, stapes removed entire.	On completion of cut, hearing improved and tinnitus ceased, but on removing stapes the hearing immediately fell to zero, and the tinnitus returned; within ten minutes vertigo began and increased, confining patient to bed twenty-four hours, then decreased, but has not entirely passed away. (Oct. 1st, 1893.)	June 26, 1893. Slight vertigo persists, no improvement in hearing or in tinnitus.
XIX.—L. o. m. c. adh. <i>Mt</i> transparent, intact.	May 30, 1893. P.ac. 6". T. f. aër. $\frac{10}{85}$, on mastoid $\frac{25}{85}$.	Cocaine. Peripheral cut, division of articulation only, stapes extracted entire, paper dressing.	With extraction of stapes, pallor, quick respiration, slowing of pulse, no apparent outflow of fluid.	No improvement in hearing.
XX.—L. o. m. c. adh. <i>Mt</i> clear, intact.	June 8, 1893. P.ac. o. T. f. aër. $\frac{5}{85}$, on mastoid $\frac{15}{85}$.	Cocaine. Peripheral cut, division of tendon and articulation, fracture of stapes, anterior crus near head, posterior crus near foot-plate.	No vertigo, no slowing of pulse.	No gain in hearing.
XXI.—R. o. c. adh. <i>Mt</i> thick, retracted. Malleus immovable on inflation.		Cocaine. Peripheral cut, tensor tympani and stapedius cut, ossicular chain mobilized without improvement. Stapes broke on traction, leaving base plate firmly fixed, paper dressing.	No slowing of pulse, no nausea.	No improvement to hearing or to tinnitus.
XXII.—R. o. c. m. c. <i>Mt</i> thickened and retracted.	May 12, 1893. Watch $\frac{8}{100}$. Voice $\frac{1}{38}$. T. f. aër. $\frac{6}{85}$, on mastoid $\frac{17}{85}$.	Cocaine. Peripheral cut. Hearing + for air, — for bone. Stapedius and joints severed, stapes circumcised. On traction crura broke, disappearing upward.	Vertigo, nausea, and vomiting. Ceased on going to bed. Suction resistance.	Hearing did not improve immediately. May 24th. Watch, $\frac{6}{100}$. Voice, $\frac{21}{38}$. T. f. aër. $\frac{26}{85}$, on mastoid, $\frac{30}{85}$.

REPORT ON THE PROGRESS OF OTOTOLOGY DURING THE SECOND HALF OF THE YEAR 1892.

NORMAL AND PATHOLOGICAL ANATOMY, HISTOLOGY, AND PHYSIOLOGY OF THE EAR AND NASO-PHARYNX.

BY PROF. AD. BARTH, MARBURG.

Translated by Dr. MAX TOEPLITZ, New York.

A.—ANATOMY.

a.—ORGAN OF HEARING.

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2. KATZ, L., Berlin. A method for rendering microscopical specimens of the external meatus transparent. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 215.

3. NORRIS, H. W. Studies on the development of the ear of amblyostoma. I. Development of the auditory vesicle. *Journal of Morphology*, vol. vii., p. i., p. 23. Two plates.

4. SARASIN, P. and F. The hearing organ of the cœciliidæ (amphibia apoda). *Anat. Anzeiger*, 1892, Nos. 25 and 26, p. 812.

5. AYERS, HOWARD. Vertebrate cephalogenesis. II. A contribution to the morphology of the vertebrate ear, with a reconsideration of its functions. *Journal of Morphology*, vol. vi., pp. 1-360, with twelve plates.

6. SCHIMKEWITSCH, W. The auricle of the vertebrates. *Rev.*

des sc. nat. soc. St. Petersburg, Année 2de, No. 9, p. 317. (Russian.)

7. ADELUNG, NICOLAI VON. Contributions to the knowledge of the tibial hearing organ of locustidæ. With two plates. *Zeitschrift f. wissensch. Zööl.*, vol. civ., p. 316.

8. BERTELLI, DANTE. Sulla membrana timpanica della rana esculenta. *Mon. zööl. ital.*, Anno 3, No. 10, p. 203.

9. RICHARDS, H. A concluding report of the anatomy of the elephant's ear. *Trans. Amer. Otol. Society*, 1891, New Bradford, 1892, vol. v., p. i., p. 139.

10. HEATON, G. Remarks on congenital malformations of the auditory apparatus. *Fourn. of Laryngol.*, London, 1892, vol. vi., p. 147.

11. BÖKE. The morphological alterations of the auricle in normal, weak-minded, and idiotic individuals. Communication from Prof. Böke's aural department of the St. Rochus Hospital at Budapest. *Orvosi hetilap*, 1891, No. 7; and *Allg. Wien. med. Zeit.*, 1891, No. 11.

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13. VARIOT, G., and CHATELLIER. Congenital malformation of the left auricle in a child; imperforation of the external meatus. Operative attempt. (Malformation congénitale de l'oreille gauche chez un enfant; imperforation du conduit auditif externe. Tentative opératoire.) *Bull. de la soc. d'anthropologie de Paris*, série iv., t. ii., p. 652.

14. VARIOT, G., and CHATELLIER. A case of congenital malformation, and a case of anomaly of the auricle in children. (Un cas de malformation congénitale et un cas d'anomalie du pavillon de l'oreille chez des enfants.) *Ibid.*, p. 568.

15. WILHELM E. Material for anthropological studies of the auricle (continued). (Matériels pour servir à l'étude anthropologique du pavillon de l'oreille (suite.) *Rev. biol. du nord de la France*, Année iv., 1892, No. 7.

16. BOULLAND. The folds of the auricle from the standpoint of the identity. *Limousin méd.*, No. 10, 1892.

17. SCHÄFFER, O. The foetal development of the ear, the frequency of foetal forms of the ear in adults, and their hereditary relations. With two plates. *Arch. f. Anthropologie*, vol. xxi., 1892, p. 77.

18. DREYFUSS, R., Strassburg. Contribution to the anatomy and embryology of the middle ear and membrana tympani in man and mammals. (Preliminary communication.) (Contribution à l'anatomie et à l'embryologie de l'oreille moyenne et de la membrane tympanique chez l'homme et chez les mammifères (note préliminaire). *Arch. int. de laryngol.*, 1892, t. v.
19. BAUMGARTEN, HANS. Contribution to the embryology of the ossicles. Inaug. Dissertation, Berlin, 1892.
20. BIRMINGHAM, O. Some practical considerations on the anatomy of the mastoid region, with guides for operating. Read in the Section of Anatomie and Physiology, January, 1891, *Trans. of the R. Acad. of Med. in Ireland*, vol. ix., 1891.
21. NIEMACK, I., Goettingen. Contribution to the histology of aural polypi. Inaug. Dissert. and *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 1. With two plates.
22. BEAUREGARD. Comparative anatomy of the inner ear. (Anatomie comparée de l'oreille interne.) Soc. de biol. *Progrès médic.*, June 25, 1892.
23. RETZIUS. The peripheric mode of termination of the acoustic nerve. *Verhandl. d. anat. Gesellsch.* at their sixth meeting at Vienna, 1892, p. 63.
24. RETZIUS. The mode of termination of the acoustic nerve. *Biol. Untersuchungen*, n. F. iii., p. 29. With two plates.
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26. BUDDE, KARL. Déhiscences in the lower wall of the tympanic cavity. Inaug. Dissert., Goettingen, 1891.
27. SCHWABACH. Disturbances of hearing in meningitis cerebro-spinalis and their anatomical foundation. *Zeitsch. f. klin. Medicin*, vol. xviii., p. 273.
28. GEBERG, A. The termination of the acoustic nerve in the cochlea of mammals. (From the histolog. laboratory of Prof. Arnstein at Kasan.) *Anat. Anzeiger*, December 10, 1892, p. 20.
29. WAGENHÄUSER. Tübingen. Anatomical condition of the labyrinth in a case of deafness from leukæmia. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 219.
30. HABERMANN, J. Contribution to the knowledge of otitis interna. Second communication. *Graz. Zeitschr. f. Heilkunde*.
31. KIRILZEW, S. Contribution to the study of the origin and

central course of the acoustic nerve. Preliminary communication. *Neurolog. Centralbl.*, 1892, p. 669.

32. HELD, HANS. A direct acoustico-cortical path, and the origin of the anterior-lateral tract in man. From the Anat. Inst. at Leipsic. *Arch. Anat. und Entw.*, Jahrg. 1892, p. 257.

33. BECHTEREW. Striæ medullares sive acusticæ of the medulla oblongata. *Medizinskoje Obosvenje*, 1892, No. 5. (Russian.)

1. WICKERSHEIMER emphasizes the necessity of carefully dispensing his prescriptions for the attainment of good preparations. His fluid is composed of : Alum, 100 parts ; chloride of sodium, 25.0 ; nitrate of potassium, 12.0 ; impure carbonate of potassium, 6.00 ; arsenious acid, 20.0 ; water, 3000.0. To these different parts, which are successively dissolved in warm water, cooled off and filtered, four volumes of glycerine and one volume of methyl alcohol are added to each ten volumes. The methods of preservation, injection, and preparation should be studied from the original. For preservation in glycerine-gelatine, the following composition is recommended : White "French" gelatine of good quality is softened for an hour in distilled water, the excess of water poured off, the gelatine liquefied upon the water bath by two parts of chemically pure glycerine and the same part (by weight) of water, and then strained through a fine cloth. As tested alloys for metal corrosions are recommended : Plumbum, 32 ; stannum, 16 ; bismuth, 60 ; and cadmium, 12. These parts are in the same succession cautiously fused, the dross removed, and to the fluid metallic mixture ten parts of mercury are added.

2. Preserved and decalcified specimens can be made transparent to the thickness of about $\frac{3}{4}$ cm, when placed in xylol or oil of cloves and then in Canada balsam ; glycerine is suitable for smaller specimens. For preservation, small glass cases with plane parallel walls, and for inspection, glasses magnifying from four to five times, are recommended ; small objects should be examined with glasses magnifying from forty to fifty times.

4. The brief communication, referring to a difference of views from those of Retzius, forms a defence of the point of view of the authors.

II. The examination of 1,487 individuals, among whom were 1,000 normal persons, results in the fact that 26 per cent. of the normal men and 15 per cent. of the sound women have irregular auricles, and that this percentage is increased among the weak-

minded and idiotic persons to one half of the individuals. The anomalies were mostly found bilaterally, but preferably in the left auricle when unilateral.

18. This preliminary communication is more fully dwelt upon by the reviewer, since SCHWALBE has promised¹ a more elaborate paper upon the subject, to be published in the *Morphologische Jahrbücher*, edited by him. The malleus and incus originate from the I. visceral arch, and represent its proximal end. The rudiment of this termination continues in the direction of the stapedia ring. It is later transformed into foetal connective tissue. This rudiment has nothing in common with the lower process of the incus. There exists therefore a stage of development when the præchondral end of the I. visceral arch is situated at a certain distance from the stapedia ring. The handle of the malleus and the lower process of the incus develop simultaneously inward and downward from the I. visceral arch. The upper process of the incus develops later. The I. visceral arch, previous to its development, meets neither the capsule of the semicircular canals nor the primordial cranium. The stapedia ring is in the beginning freely situated in the mesodermal connective tissue, and is connected, but later, with the periosteal capsule. It develops from cells, which are grouped around a small vessel. It cannot be determined whether the stapes originates from the I. or II. visceral arch. In the præchondral capsule of the labyrinth the oval and round windows are rapidly differentiated. In the latter the præchondral tissue is directly transformed into connective tissue. In the oval windows of various animals direct transformation into connective tissue takes place, which disappears later on; in others (in man) an intermediary stage of cartilage is found. Hence follows, that the labyrinthine capsule does not participate in the development of the stapedia plate. The annular ligament also develops from præchondral tissue, into which additional cells from the perichondrium of the tympanic cavity grow. The connection between the II. visceral arch and the capsule of the labyrinth, which was interrupted, for some time, by absorption, is later restored by insertion of tissue. The middle layer of the membrana tympani is a non-ossified portion of the tympanic ring. Rivini's incisura and Shrapnell's membrane indicate the place where the handle of the malleus had advanced from the upper part of the

¹ It has been published in the meantime, in German, with two plates. See *Morphol. Arbeiten*, by G. Schwalbe, vol. ii., No. 3; Gust. Fischer, Jena.—Moos.

tympanic cavity *in front* of the tissue proper of the membrana tympani. There exists no foramen Rivini (wrongly printed "incisura").

21. NIEMACK examined from the material of the aural polyclinic at Goettingen, 55 different aural polypi, among which he found: 5 fibro-epitheliomata; 10 granulation tumors; 3 angiomata; 16 angio-fibromata; 8 polypi with succulent tissue of which 5 were infiltrated with lymphoid, 3 with mucoid, parenchymatous fluid; 6 fibromata; 5 myxomata; 1 adenoma. It frequently occurs that erect cylindrical cells of the surface of polypi are transformed into horizontal, flat cells, but real metaplasia of cylindrical epithelia into pavement epithelia was not observed by the author. The capillaries are frequently filled with pus cells in the place of red corpuscles. Giant cells probably arise from proliferation of vascular endothelium. Blood pigment was frequently found, invariably in form of hæmosiderin. Hæmatoidin crystals were of rare occurrence. Polypi may lead secondarily to aural suppurations (?). Peculiar globules, which are stained by iodine a straw-yellow, not brown, and can be well distinguished from additional corpora amylacea, are considered as products of disintegration, closely allied to fibrin.

23. RETZIUS, according to investigations of the papilla basilaris of the cochlea of birds and mammals, has reached the conclusion that the hair cells of the epithelium are not directly connected with the nerve fibres of the acoustic, but are closely surrounded by them. These nerve fibres, however, represent peripheric processes of the bipolar ganglionic cells, which are imbedded in the acoustic and send their second process centrally toward the brain. These ganglionic cells are thus of the same value as the olfactory cells of the olfactory organ. They represent a higher stage of development of the cells of the sensory nerves, which are separated from the epithelium and displaced quite a distance toward the brain. The hair cells of the hearing organ, therefore, are no "nerve cells," but a kind of "indirect" sensory cells, which have entered secondarily the organisms of the organ of sense.

27. In consequence of cerebro-spinal meningitis, a female patient, aged thirty-two, had become entirely deaf in one ear, and partially for low tones in the other. Purulent infiltration, ecchymoses, and partial destruction of the acoustic were found. In the ear with better hearing-power the turns towards the base were

less changed than at the apex. The case furnished in one ear a positive contribution to Helmholtz' theory, and it demonstrated in the other, that in affections of the inner ear, the middle ear being intact, occasionally the usual relation of the perception of high and low notes may be reversed.

28. GEBERG injected a solution of methylene blue into the ascending aorta of narcotized animals, which he killed after 15 to 30 minutes. In the fresh organs of Corti the end fibrillæ of the acoustic were found to be attached to the hair cells, but not connected with them.

29. The petrous bones were derived from a person, æt. thirty-five, who had succumbed to lienal leukæmia. In either labyrinth hemorrhages and also new-formation of connective tissue and bone were found. External and middle ear were normal.

30. HABERMANN furnishes an additional contribution of two cases to the diseases of the inner ear. In one case he found purulent cerebro-spinal meningitis and bilateral purulent inflammation of the middle and inner ear of a child nine months old. In addition to the appearances of an old inflammation, which had run its course, those of a fresh one existed. The inner ear had suffered from a fibrino-purulent inflammation, principally in the perilymphatic space with partial transmission to the endolymphatic space. He believes according to the result of examination and the former investigations, that the inflammation has not been transmitted from the middle ear, but from the brain to the inner ear. In the second case the hearing organs were derived from a deaf-mute boy, who, in his fourth year of age, had been affected with otitis interna, which had caused his deafness. In the seventh year of age he died from morbilli with pneumonia. Apart from fresh changes of inferior importance defects in the nerves of the turn of the base and apex of the cochlea were found as symptoms of the former affection; furthermore defects in the nerves and ganglionic cells of Rosenthal's canal, extreme alterations of Corti's organs and of the endosteal lining of the inner ear. Osseous occlusion of the aquæductus cochleæ and extreme extension of Reissner's membrane and of the sacculus rotundus were limited to one ear. The changes are to be considered partly as consequences of cerebro-spinal meningitis, partly as post-mortal alterations.

31. The investigations are conducted under the guidance of Dr. Darkschewitsch at Moscow and are not as yet concluded.

The results attained heretofore are given as follows: The inner and Deiters' nuclei do not serve as places of termination for the fibres of the acoustic, at least of its posterior root. The anterior nucleus and the tuberculum acousticum are primary centres of the posterior root of the acoustic. The upper olives also form one of the primary centres of the acoustic. The fibres of the acoustic which terminate in the upper olives take their course from the trunk of the acoustic into the corpus trapezoideum and are the fibres of the root, viz., they are not interrupted in their path by ganglionic cells. It has not been decided whether these fibres belong to the anterior or posterior root of the acoustic. The striæ acusticæ originate from the tuberculum acousticum and take their course to the upper olive of the other side. The greater portion then runs with the lower lemniscus to the posterior portion of the lower bigeminum. A small portion runs also to the olive and bigeminum of the same side.

b.—NASO-PHARYNX.

1. WILDER, HARRIS H. The nasal region of *menopoma al-leghaniense* and *amphioma tridactylum*, with remarks upon the morphology of the *ramus ophthalmicus profundus trigemini*. From the Anatom. Instit. at Freiburg. With two plates. *Zoöl. Jahrb. Abth. f. Anat.*, vol. v., 1892, p. 155.
2. ZUCKERKANDL. The development of the ethmoid bone. *Verhandl. der Anat. Ges. of Vienna*, June, 1892, p. 291.
3. BRUNN, A. VON. Contributions to the microscopical anatomy of the human nasal cavity. *Arch. f. microsc. Anat.*, vol. xxxix, No. 4.
4. RETZIUS, G. The mode of termination of the olfactory nerve. *Biol. Untersuchungen*, n. f. iii, p. 25. With one plate.
5. PREOBRASCHENSKY, S. Contributions to the study of the development of the olfactory organ in the chick. With one plate. *Mittheil. aus d. embryol. Inst. d. Univ. Wien*, No. xii., zweite Folge, No. v., 1892.
6. MERKEL, FR. Jacobson's organ and papilla palatina in man. *Anatom. Hefte*, vol. i., part 1, 1892, p. 215.
7. BRUNN, A. VON. The termination of the olfactory fibres in Jacobson's organ in the sheep. *Arch. f. microscop. Anat.*, vol. xxxix., No. 4.

8. LENHOSSÉK, M. VON. The nerve origins and terminations in Jacobson's organ in the rabbit. *Bâle Anat. Anzeiger*, 1892, Nos. 19 and 20.

9. SLUITER. Jacobson's organ in the crocodilus porosus. *Amsterdamer Anat. Anzeiger*, 1892, p. 540.

10. CHIARUGI, GIULIO. Sullo sviluppo del nervo olfattivo nella *Lacerta muralis*. *Mon. Zoöl. ital.*, Ann. 3, No. 10, p. 211.

11. CORNIL, C. Results attained by Golgi's method applied to the study of the olfactory bulb. (Des résultats obtenus par la méthode de Golgi appliqué à l'étude du bulbe olfactif.) *Mém. de la soc. de biol.*, série ix., tome iv., 1892, p. 179.

12. CHOLEWA. The feasibility of probing the frontal sinuses. *Berlin. Monatsschr. f. Ohrenheilk.*, etc., 1892, Nos. 8 and 9.

13. HOCHSTETTER. The formation of the primitive posterior nares in man. *Verhandl. der Anat. Ges. zu Wien*, June, 1892, p. 181.

14. RÉTHI, L. The nerve roots of the muscles of the pharynx and palate. F. Tempsky, Vienna. *Sitz. Ber. d. Kais. Ac. d. Wiss.*, vol. ci., p. 622.

15. NORTH. Physiology and pathological anatomy of the oral tonsils. *Fourn. of the Amer. Med. Ass.*, October 15, 1892.

16. ROMANE. Physiological and bacteriological study of the tonsil. (Étude physiologique et bactériologique de l'amygdale.) *Thesis*, Paris, 1892.

2. In the second foetal month the first rudiment of the ethmoid bone is quite smooth upon the surface, and the ethmoid conchæ, the processus uncinatus, and the bulla ethmoidalis are still absent. In the third month the nasal surface of the ethmoid tubercle exhibits a deep furrow (*fissura ethmoidalis inferior*), which indicates the division into two ethmoid conchæ. At the turning-point of the maxillo-turbinal into the nasal capsule a ridge of the mucous membrane projects against the middle meatus, representing the first rudiment of the processus uncinatus. In the fourth month the ethmoid conchæ present nearly their definite form. (*Cp.* for additional facts these ARCHIVES (German edition), vol. xxiii., p. 279, No. 8.)

8. The author describes the cells and nerve terminations in Jacobson's organ, as represented by the preparation according to Golgi's method in an embryo of the rabbit, 30 mm long. These investigations are essentially in accordance with those of Brunn.

There exist supporting and olfactory cells, but a double relation with reference to innervation, viz., sensory fibres, and also terminal fibres, the latter like those first described by Cajal. It cannot be ascertained whether the latter originate from the olfactory or trigeminus, since both views can be supported.

9. SLUITER could demonstrate that in a stage of development, preceding the rapid elongation of the snout, Jacobson's organ is well developed. It undergoes later retrogressive changes. It could not be ascertained from his material which cavity at the roof of the oral cavity, found at later stages, corresponds to that organ.

12. CHOLEWA, after an examination of more than a hundred specimens, arrives at the conclusion, that probing of the frontal sinus is impracticable in about 20 per cent. on account of projection of the ethmoid cells, in further 20 per cent. by the formation of the middle turbinated bone, but practicable in about 60 per cent.

13. Examinations of three human embryos, 7.0, 11.0, and 15.5 mm long, resulted in the fact that the formation of the primitive choana in man, similar to that in the cat and rabbit, occurs by the perforation of the nasal cavity toward the oral cavity. The statements of the authors of a fissure connecting the nasal and oral cavities, which is said to exist at a distinct period of development, and of which the primitive choana is said to be preserved as remnant, the so-called nasal furrow or sulcus, do not agree with the facts.

B.—PHYSIOLOGY.

a.—HEARING ORGAN.

1. LANGE, VICTOR, Copenhagen. Can the microphone be advantageously used for the construction of an apparatus for the improvement of hearing? *Deutsche med. Wochenschr.*, 1892, No. 15.

2. OSTMANN, Koenigsberg. The importance of the incisuræ Santorini as protective arrangements. *Arch. f. Ohrenheilk.*, vol. xxxiii., p. 161.

3. OSTMANN, Koenigsberg. The value of the panniculus adiposus of the lateral wall of the tube. A contribution to the study of autophony. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 170.

4. MILLET. Colored hearing (audition colorée). Paris, O. Doin, 1892.

5. BEAUREGARD. The rôle played by the round window (rôle de la fenêtre ronde). Soc. de biol. *Tribune méd.*, June 23, 1892.

6. OSTMANN. Protective arrangements in the labyrinth against increase of pressure. Verein f. wissenschaftl. Heilkunde at Königsberg. Meeting of January 11, 1892. *Deutsche med. Wochenschr.*, 1892, p. 593.

7. OSTMANN, Königsberg. Pressure and increase of pressure in the labyrinth. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 35.

8. URBANTSCHITSCH, V., Vienna. The influence of weak impulses of sound upon the increment of acoustic sensation. *Arch. f. Ohrenheilk.*, vol. xxx., p. 186.

9. GIRARD. Investigations upon the function of the semi-circular canals of the inner ear in the frog (recherches sur la fonction des canaux semi-circulaires de l'oreille interne chez la grenouille). *Arch. de Physiol.*, April, 1892.

10. CHARLESK. The localization of the hearing centre. *Brain*, 1892, p. 465.

1. VICTOR LANGE, on account of many experiments, has reached the conclusion that the microphone does not intensify but only transmits the sound. He has constructed a portable microphone, which acted well upon normal persons. Deaf patients without exception passed an unfavorable judgment upon it. The hearing was not improved by the apparatus.

2. According to OSTMANN the incisuræ Santorini act like hinges, so as to enable a displacement in direct action of trauma, without occurrence of injuries.

3. OSTMANN discusses the heretofore unsatisfactory attempts at explaining the phenomenon of autophony in extremely emaciated individuals. He examined for this purpose two cases of tubes of normally nourished, and also two of extremely emaciated persons. In the former deposits of fat were found principally upon the lateral wall, to a lesser extent also upon the medial wall of the tubes, which in the emaciated specimens were reduced to a minimum. He demonstrates that, under these circumstances, the agents attending to keep the tube open readily preponderate, so as to keep apart the walls of the cartilaginous tube at their narrowest place. The fatty cushion of the lateral wall of the tube thus forms a protective arrangement for the middle ear. Energetic action of the muscles of the tubes, principally that of

the musculus dilatator tubæ, and also its direct connection with the lateral membranous wall, is conducive to temporary opening of the tubes, which is not produced by paralysis of the openers of the tubes, as it has been heretofore frequently assumed.

7. The experiments made with interpolated elastic small sacs upon communicating tubes, arranged in a certain manner, led to the following result: 1. If the endolymph were under higher pressure than the perilymph, this excess should be borne by elastic tension of the walls of the membranous labyrinth. This tension would be extremely unsuitable for the transmission of sound upon Corti's organ. 2. It is to be assumed that the perilymph and endolymph bear the same pressure, which is somewhat lower than the intracranial pressure. 3. The fluctuations of pressure of the liquor cerebro-spinalis due to respiration and pulse are not transmitted to the labyrinth. 4. Eventual escape of perilymph and endolymph, with increase of pressure in the labyrinth by excessive vibrations of sound, occurs simultaneously. 5. The protective arrangements of the labyrinth prevent depression of the vestibular membrane and consequential injury to Corti's organ with increased intracranial pressure. 6. The loss of the high notes in injuries to the nervous end apparatus of the acoustic by excessive vibrations of sound, can be explained by prolonged and intensified action of pressure of the endolymph upon the structures situated in the first cochlear turn and upon the nerve fibres in Corti's organ.

8. From well known cases in literature, and from his own various experiments made upon individuals with normal and decreased acuteness of hearing, decreased by different causes, with reference to the faculty of hearing extremely varying modes of sound with simultaneous action of a sound or tone upon the ear experimented upon, URBANTSCHITSCH arrives at the conclusion that an improvement of hearing in a noise depends upon an increase of the acoustic threshold sensation, and that it is quite questionable whether the conducting apparatus participates in this phenomenon.

b.—NASO-PHARYNX.

1. FÉRÉ, M. CH., BATIGNE, P., and OUYEY, P. Investigations upon the minimum of smell and taste perceptible in epileptics. *Mémoire présenté à la soc. de biol.* Meeting of July 30, 1892. (Reviewed in *Neurol. Centralbl.*, 1893, p. 20.)

1. Sixty-six per cent. of 115 epileptics examined were found with decreased sensation of smell. Remedies applied for epilepsy had no influence upon the sensation of smell. Bromide of potassium was injurious, when otherwise not well borne either. Loss of taste was found in two cases, decrease in 65 per cent.

C.—PATHOLOGY AND THERAPEUTICS.

BY DR. ARTHUR HARTMANN, BERLIN.

Translated by Dr. MAX TOEPLITZ, New York.

GENERAL LITERATURE.

1. KOELIN, J. M. Statistical contributions to aural diseases. Dissertation, Zurich, 1892.
2. NIMIER. Contribution to the study of the geographical distribution of aural diseases in France. *Annal. des malad. de l'oreille*, No. 10, 1892.
3. WHITEWELL, R. X. Observations made in India. *Indian Med. Gazette*, August, 1892.
4. TSAKYROGLOUS, M., Smyrna. From my practice: Etiological contributions to aural diseases. *Monatsschr. f. Ohrenheilk.*, No. 7, 1892.
5. LICHTENBERG, ROMEL, Budapest. Disturbances of hearing of railroad employees with reference to the safety of the travelling public. *Monatsschr. f. Ohrenheilk.*, etc., Nos. 11 and 12, 1892.
6. SCARAMCYZA. Aural affections in influenza. *Il sordomuto*, 1892.
7. AIROLDI. Aural affections in cerebro-spinal meningitis. *Ibid.*
8. VALLI. Otitis interna in late hereditary syphilis. *Ibid.*
9. GRAZZI, Florence. Epidemic parotitis as a cause of deafness. The education of deaf-mutes. *Bolletino delle mal. dell' orecchio*, etc., Feb., 1892.
10. Prof. URBANTSCHITSCH. The mutual relations between both hearing organs. *Wiener klin. Wochenschr.*, No. 46, 1892.
11. GELLÉ. Symptomatic value of the reflex of binaural accommodation. *Soc. de biologie*, March 14, 1892.
12. STAMOFF, Z. Clinical investigation on electric vertigo in aural affections. Dissert., Geneva, 1892.

13. HOLANOFF, P. S. Clinical studies on paraculis Willisii. Dissert., Geneva, 1892.

14. POLLAK, Vienna. Contribution to the treatment of subjective sensations of hearing. *Zeitschr. f. Therapie*, August, 1892.

15. LUBET-BARBON, Paris. The use of bromethyl as an anæsthetic. *Revue de laryngologie*, etc., No. 16, 1892.

16. STETTER. Polypoid growths in the external meatus, due to sarcoma of the cranial base. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 54.

17. ROHRER. Further experiments upon the antimycotic action of aniline dyes. *Arch. f. Ohrenheilk.*, vol. xxxiv., p. 226.

18. UCHERMANN, V., Christiania. Sudden deafness in otitis media. *Nord. mag. f. Læger*, No. 6, 1892.

19. GRADENIGO, Prof., Turin. The prophylaxis of deaf-mutism. *Il Sordomuto*, Supplement to Nos. 3 and 4, 1892.

20. GELLÉ. Result of anatomical examination of a deaf-mute woman. *Il Sordomuto*, 1892, p. 231.

21. DE ROSSI, Prof. The necessity of special physicians for the treatment of the ear, eye, and larynx in institutions for the deaf-mute. *Archivio Ital. di otologia*, etc., vol. i., No. 4.

1. KOELIN has used the material of Rohrer at Zurich (4,768 cases during the years 1886 to 1890) for his statistics, which are in entire accordance with those of the authors referred to. It is, however, to be regretted, that the main table (II.) presents such an arrangement of the forms of diseases as to render its scientific importance uncertain. SIEBENMANN (Bâle).

2. NIMIER's tables show the proportion of the enrolled men of the different departments who, exempted from service or assigned to the reserves, were found with changes in the hearing organ among 10,000 examined persons. The tables were made according to the report of the revising councillors of the years 1887 to 1890. We infer from these reports that the average number is 55 to 10,000, that this is exceeded in 44 departments, in one (Charente) by the treble amount, in three (Manche, Nièvre, Côte du Nord) by more than the double figure. From the appended maps, one is astonished to find that the least affected department is situated south of the degree of latitude through the mouth of the Loire. Other tables present the distribution according to climate and race. GELLÉ (Paris).

3. From observations made in India WHITEWELL has come to

the conclusion, that post-nasal growths and their attendant complications are very common among the natives. It appears, therefore, that these troubles are by no means the result of advanced civilization or intellectual development.

4. According to the experience of TSAKYROGLOUS, nearly all divers for sponges are hard of hearing or deaf. They jump with a heavy marble into the sea to a depth of thirty fathoms, and suffer, by the rapidly increasing water pressure, from ruptures of the membrana tympani with consecutive inflammations and suppurations. In opposition to influenza, dengue fever rarely produces aural affections; this holds also good of malaria. In lepra the posterior surfaces of the auricles become anæsthetic at an early stage and present the formation of nodules.

G. KILLIAN (Freiburg).

5. Among 250 train employees LICHTENBERG found 14 with chronic catarrh of the middle ear, 3 with otorrhœa, 1 with otitis media acuta, 1 with hyperæsthesia of the acoustic nerve, 3 with affections of the labyrinth, 1 with hyperostosis of the external meatus, 4 with anomalies of tension of the membrana tympani, 1 with extreme scaling in the external meatus, 36 with ceruminous plugs, 5 with "organized infiltrations" of the membrana tympani, 5 with cicatrices of the drum-membrane, 4 with "dry defects of the membrane," and 1 with circumscribed atrophy of the drum-membrane. He emphasizes the frequency of the catarrhal affections of the ear (32) against the scantiness of affections of the labyrinth (3 cases), and also the frequency of ceruminous plugs (36 cases), which did not occlude the ear in all cases. Of the 32 catarrhal affections about 20 were acquired during active service, 12 of which had led to considerable deafness. Lichtenberg does not consider an average acuteness of hearing as sufficient to prevent all dangers of the service, and demands an exact otological examination of the employees for admission, and also one every other year after the admission into service.

G. KILLIAN.

6. SCARAMCYZA, after an extensive bibliography, briefly describes the observations made at the otological polyclinic at Turin. The number of affected men was twice as large as that of the women; the ages of from 20 to 40 were most frequently concerned. Thirty-five cases of catarrhal (19 bilateral) and 41 of purulent (7 bilateral) inflammations of the middle ear occurred. In 10 cases chiselling of the mastoid process was necessary. Two

cases of affection of the labyrinth were observed, a primary and a secondary case with otitis media. GRADENIGO.

7. AIROLDI reports seven cases of aural disease in cerebro-spinal meningitis. GRADENIGO.

8. VALLI observed nine cases of otitis interna in hereditary syphilis. GRADENIGO.

9. GRAZZI reports two additional cases of deafness from parotitis epidemica. In the first case, concerning a boy, æt. twelve, with parotitis prevalent in the right side, deafness, tinnitus, and vertigo occurred in convalescence. Vertigo disappeared later, but complete deafness remained in the right ear; conversation was perceived in the left ear at a near distance. Treatment was unsuccessful. The second case occurred in a girl, æt. seventeen, with severe parotitis; complete deafness took place in the right ear without tinnitus and vertigo. Treatment was also without avail. GRADENIGO.

10. URBANTSCHITSCH distinguishes homogeneous and heterogeneous mutual relations between the two hearing organs. The former consist of phenomena of the same character in both ears, as *e. g.*, disturbances of hearing in one ear followed by the same in the other; the latter consist of phenomena of different character in one ear produced by those in the other. Homogeneous mutual effects may be of vasomotor (in severance of the sympathetic and in pinching of the auricle), trophic (sympathetic, alternating inflammations), sensory (in neuralgia or other sensations of pain) or functional character. Urbantschitsch observed heterogeneous mutual relations quite markedly in probing the Eustachian tubes. Inflammation of one ear frequently diminishes the function of the other. The extremely practical importance of these relations may be recognized from: 1, the increased acoustic excitation in binaural hearing; 2, the increased therapeutic effect of bilateral treatment; and 3, the favorable influence, which may be exerted by operative interference with the conducting apparatus of one upon the other ear, principally by removal of injurious influence of accommodation.

11. According to GELLÉ's examinations, a slight pressure upon the membrana tympani of a normal ear may influence the hearing power of the opposite one. This reflex disappears or may disappear in the course of cervical pachymeningitis. The reflex is preserved in hysterical unilateral deafness and also in various cerebral disturbances. It disappears invariably, if the disturbances

of the conducting apparatus originate from the acoustic and the medulla oblongata.

12. In conjunction with Wyss, director of the oto-laryngological clinic of the university at Geneva, STAMOFF applied to 130 hearing organs the constant current in order to produce electric vertigo. He found, that in the majority of acute affections of the middle ear, a much weaker current was required for the production of vertigo than in the normal ear. Electric sensation of sound does not occur, a few cases excepted, in those patients, in whom the constant current causes vertigo; inversely the vertiginous phenomena are usually missing, when ringing is caused by the current.

SIEBENMANN.

13. The paper written under the guidance of Wyss contains the histories and examinations of 26 deaf persons affected with paracusis Willisii. The functional examination points in most cases to the existence of an affection of the middle ear, and, therefore, in all 26 cases Galton's whistle was better perceived through the hearing tube than without it. In some patients the alleged paracusis was examined experimentally, viz., during a ride in the railroad car or during the roar of drums, tambourine, etc., the human voice (conversation) was used for examination. Marked improvement was noticed only in intense noises and with concussions of the body.

SIEBENMANN.

14. POLLAK recommends in cases with reaction of the acoustic nerve in currents of medium strength (6 to 8 milliampères), systematic treatment of the subjective noises. He reports favorable results, but without influence of galvanization upon the hearing power. We refer the reader to the original for the method.

I. POLLAK (Vienna).

15. LUBET-BARBON recommends the use of bromethyl for the operation of adenoid vegetations, aural polypi in unmanageable children, and of thickenings of the septum in the region of the posterior extremities of the turbinated bodies, although these operations last longer than the action of the drug; furthermore in extraction of the ossicles and curetting of the tympanic cavity. He has operated in three years on more than 1000 patients in this manner without injury to the patient.

BOK (Berlin).

16. The patient was admitted on account of otitis media purulenta with granulations, paralysis of the left acoustic nerve, paralysis of the left vocal cord and of the œsophagus. During the subsequent weeks facial paralysis of the left side and weak-

ness of the left arm were added. STETTER, on account of pains below the left mastoid process, opened the left occipital fossa, assuming an intracranial progressing inflammation. Pus was not found, but dark, venous blood discharged after incision of the dura mater. The operation did not retard the disease. Successively, paresis of the left abducens, choked disk, exitus letalis occurred without fever or decrease of mental faculties. The post-mortem revealed extensive destruction of the base of the skull upon the left boundary line of the large occipital foramen, of the left half of the clivus Blumenbachii and of the medial and basal half of the petrous portion of the left temporal bone. The destruction comprised particularly the foramen spinosum, the meatus auditor. intern., the foramen jugulare, and the foramen condyl. anterius.

RUMLER (Berlin).

17. Threads of silk imbued with anthrax and impregnated with a solution of one per thousand of hexa-ethyl pyoctanin produced neither directly nor after washing, a development of anthrax cultures. Inoculations upon mice gave also negative results. Solutions of one per cent. of auramin could not destroy the vitality of anthrax spores in 48 hours, but solutions of methyl and ethyl pyoctanin destroyed it. ROHRER used pyoctanin in substance successfully in aural and nasal eczema and in chronic offensive suppurations of the tympanic cavity, but in powders of two per cent. in the nose and larynx. He considers it more efficacious than methylene blue, recommended by Bresgen. The new antiseptic, oxychinaseptol (diaphtherin) was found to be very useful. It was applied to the ear in solutions of one per cent., to the nose in those of 0.1 to 0.2 per cent.

RUMLER.

18. UCHERMANN presents a boy, age fifteen, who after bilateral, purulent, non-treated otitis media (post scarlatinam) suddenly became completely deaf. Two hours subsequently he was admitted to the clinic. In one ear the promontory was denuded of mucous membrane, in both ears extreme swelling of the mucous membrane; no ossicles. The left side presented facial paralysis. Injections of pilocarpine were tried for treatment, but without avail. The boy was referred to an institution for deaf-mutes.

UCHERMANN.

19. GRADENIGO points out many erroneous statements in the Italian statistics on deaf-mutism in the year 1887.

GRADENIGO.

20. Among the most important alterations found by GELLÉ at

the autopsy of a deaf-mute person, there were ankylosis in the oval window, atrophy of the nervous elements of the labyrinth and atrophy of the acoustic nerve, the facial being normal. (Microscopical examination does not appear to have been made.)

GRADENIGO.

21. DE ROSSI draws inferences from a series of investigations upon the relations of the ear and nose in deaf-mutes. He demands periodical otological examinations and treatment of the inmates of the institutions for deaf-mutes.

GRADENIGO.

INSTRUMENTS AND METHODS OF EXAMINATION.

22. Prof. BEZOLD. A continuous series of tones as a method of examination for the hearing power. *Munch. med. Wochenschr.*, 1892, No. 33.

23. BING, Vienna. Contribution to the study of bone-conduction through the head. *Wiener med. Blätter*, 1892, Nos. 31 and 32.

24. ZWAARDEMAKER. Sharpness of hearing (Gehoorscherpfe). *Med. Tijdschrift voor Geneeskunde*, 1892, No. 6.

25. DAVIDSOHN, H. Electric transillumination of the face as a positive means of diagnosis of empyema antri Highmori, with reference to the form of the hard palate. *Berl. klin. Wochenschr.*, 1892, Nos. 27 and 28.

26. ZIEM. Contribution to the transillumination of the facial bones. *Berl. klin. Wochenschr.*, 1892, No. 33.

27. JACKSON CHEVALLIER. A practical illuminator. *N. Y. Medical Record*, October 29, 1892.

28. JACKSON, CHEVALLIER. Some galvano-cautery electrodes. *N. Y. Med. Four.*, Nov. 12, 1892.

29. ZIEM, Danzig. The palpation of the upper and lower pharyngeal cavity and of the larynx. *Therap. Monatsh.*, Aug., 1892.

30. SCHÜTZ, Mannheim. A pharyngeal tonsillotome. *Munch. med. Wochenschr.*, 1892, No. 40.

31. WHITING, FRED. A new Eustachian electrode. *N. Y. Med. Four.*, Dec. 10, 1892.

32. MYLES, ROBERT C. Accessory sinus irrigation tubes. *N. Y. Med. Rec.*, Nov. 19, 1892.

33. DUNN, JOHN. A modified Hartmann's snare; some remarks upon its use. *N. Y. Med. Rec.*, Sept. 24, 1892.

34. DUNOTT, THOMAS J. A self-retaining mouth gag. *N. Y. Med. Four.*, Nov. 12, 1892.

35. GRIFFIN, HARRISON. An anatomical spatula. *N. Y. Med. Four.*, Sept. 24, 1892.

36. RAYNOR, F. C. A new uvulotome. *N. Y. Med. Four.*, Oct. 8, 1892.

37. MUNGER, CARL E. A modified Gottstein's curette. *N. Y. Med. Rec.*, Sept. 3, 1892.

38. DUNN, JOHN. A pair of post-nasal scissors. *N. Y. Med. Four.*, Nov. 26, 1892.

39. GIBBONS, PETER J. The treatment of nasal stenosis by means of a new intranasal tube. *N. Y. Med. Four.*, July 9, 1892.

22. Lecture with demonstration in the Society for Physiology and Morphology at Munic. BEZOLD succeeded in supplementing his well-known tona series in the lower region by a tuning-fork, manageable by the hand, which allows him to supplement the tones of from 30 to 16 vibrations—by increasing and displacing the weights; for the majority of persons with normal hearing the lower limit is thus reached. With reference to the results of examinations, Bezold mentions that the interstices of tone, which are thereby demonstrable, are mostly found at the upper and lower end, not unfrequently in the continuity of the series; that, on the other hand, in deaf and deaf-mute persons, circumscribed places—called islands by Bezold—exist with preserved perceptibility. What changes cause these partial defects, a large number of autopsies, preceded by exact examinations of the living, shall reveal. A considerable portion of these cases and also the islands, at any rate, can be localized with great probability in the labyrinth. Two deaf-mutes with such islands are presented. MÜLLER (Stuttgart).

23. BING sums up his observations as follows: The vibrations of a source of sound (watch, tuning-fork) in contact with the bones of the head, pass the bones in form of condensed and rarified waves directly to the interior of the labyrinth, and are perceived if they are sufficiently intense and if the perceptibility of the nervous hearing apparatus corresponds with it. This perception of sound is transferred directly through the bones of the head without interference of the structures of the tympanic cavity, as it has been clinically demonstrated in many cases. A

participation of the tympanic apparatus is not only unnecessary, but, on account of the contradiction of the pertinent phenomena, rather questionable. The transference of vibrations from the bones of the head to the ossicles does not take place. Conduction through the bones of the head and through the tympanic apparatus differ essentially from each other. POLLAK.

24. ZWAARDEMAKER, after an elaborate consideration of the value of the whispered speech for the determination of acuteness of hearing, explains the various instruments devised for this purpose. He sums up as follows: 1. Examine the acuteness of hearing with the whisper and express the result in a fraction, the numerator of which expresses the number of metres at which the patient perceives the whisper, and the denominator the number of metres at which the normal ear perceived it. 2. The sense of musical sound is examined with the largest possible number of the tonic scale. For a preliminary information, C, C², and *f* major⁴ are sufficient; for complete examination, C, c, c¹, c², c³, c⁴, c⁵ are to be recommended. 3. The sensation of sound is either expressed by percentages of the normal hearing time, or, better, by physical measures, viz., by micro-millimetres of the amplitude which gives the impression of sound. 4. If the examination with tuning-forks takes up too much time, determine the sensation of sound at least as to *one* place in the first zone of the hearing line. POSTHUMUS MENYJES.

25. DAVIDSOHN uses the fact that the eyes of a patient are surrounded by a dark ring and reflect a fiery red glow when transilluminated from the mouth by an electric lamp, for diagnosis of empyema antri Highmori, by asserting that "the transillumination of the eye positively excludes the presence of pus under all circumstances, even in small quantity." From the fact that the eye remains dark, the presence of pus in the antrum cannot be inferred, "since also in highly arched hard palates and in steeply declining lateral parts of the alveolar process, the transillumination had invariably a negative result." RUMLER.

26. ZIEM briefly argues against Davidsohn's paper by demonstrating, on account of a drawing made by Zuckerkandl, that the eye might glow in spite of pus in the maxillary cavity. RUMLER.

27. The apparatus consists of a German-silver lamp-box, silvered within and blackened without, containing a fifty candle-power incandescent lamp. A silvered glass rod, the silvering

being protected by enamel, passes through an asbestos cork fitted into a lateral metal neck. The brilliant light of the box is transmitted axially through the rod. The box is attached by the "attachment plug" to the socket of any incandescent lamp after removal of the latter.

MAX TOEPLITZ.

28. The electrodes differ from the ordinary ones in the manner of their insulation, dispensing with the thread winding, and substituting hard rubber "vulcanized on" to the conducting wire. Reviewer does not agree with the author's views that the electrodes with thread winding are not well insulated and too bulky, which is certainly not the case with Schech's instruments, but he agrees that the vulcanized ones can be more readily sterilized.

MAX TOEPLITZ.

29. I. Palpation of the naso-pharyngeal cavity ought to be made before inspection, because it suffices in about four-fifths of all cases for diagnosis and it renders superfluous the tedious and circumstantial examination with the mirror and essentially facilitates surgical procedures in this region. Palpation is said to be less disagreeable to the patient than rhinoscopia posterior if properly made, viz., if violent manipulations are avoided (for this purpose either deep inspirations are made through the widely opened mouth (Schwarze), or pronunciations of the French "on" (Voltolini), or swallowing with somewhat closed mouth (ZIEM). II. Palpation of the lower pharyngeal cavity (pars oralis + pars laryngealis, thus being designated by Ziem), is important for the diagnosis of œdema glottidis, tumors (lingual tonsil, retropharyngeal tumors), and foreign bodies. III. Palpation of the laryngeal cavity should be practised for intubation. The author deems it also possible to place the snare around laryngeal tumors situated in the upper part of the larynx under the guidance of the finger.

ZARNIKO (Hamburg).

30. The instrument is constructed on the principle of Fahrenstock's tonsillotome, the knife running in a curve (*cf.* illustration). SCHÜTZ has succeeded in wellnigh all cases, in attaining thereby thorough extirpation by a single cutting. Furthermore a so-called compressor is demonstrated which supersedes plugging. It is formed by a metal plate of the form and size of the naso-pharyngeal portion of the tonsillotome, which after being wrapped with thread is introduced into the naso-pharynx and there pressed against the bleeding spot for one or several minutes.

MÜLLER.

31. WHITING'S Eustachian electrode consists of a metal tube with a bulbous extremity not unlike an ordinary catheter, as which, in fact, it can be used, surrounded with a hard rubber envelope. The connections are made by means of a metal socket at the open end of the catheter and a wet sponge in the external meatus. He has found electrization of benefit in the tinnitus and deafness attendant upon atrophic rhinitis.

SWAN M. BURNETT.

32. MYLES devised a set of silver tubes of different sizes ranging from one, with a little larger calibre than that of a hypodermic syringe, to one with a canal of the width of No. 22 platinum wire. The tubes can be bent and easily introduced from the nasal cavity in the manner described by the author. They may be connected with rubber tubes for attachment to a proper syringe. For washing out the frontal sinus, the anterior end of the middle turbinated body should be removed and the infundibulum curetted. The ethmoid cells are washed out through an artificial opening in the roof of the space beneath the middle turbinated body.

MAX TOEPLITZ.

33. The advantage of the snare consists in the flattening of the tubes. The difference between the modified and the original snare lies in the greater length, in flattening the entire length, in the production of a more delicate canula, and in the addition of a curette to the guillotine.

MAX TOEPLITZ.

34. DUNOTT claims for his instrument that it retains its position under all circumstances, on account of its point of support being placed posteriorly on the neck, instead of in front, as it is in all other gags.

MAX TOEPLITZ.

35. The tongue depressor is $3\frac{1}{2}$ inches long, a little over an inch in its widest part, and concave in the lower portion, so as to cover the convex dorsum of the tongue.

MAX TOEPLITZ.

36. The male blade has at its distal extremity a curved knife, cutting scimeter-like on the convex and playing across the ring of the female blade. The inner margin of the ring is bevelled from the lower side, and ground to a cutting edge. The seizing hooks are separated when the instrument is fully opened. For operation the instrument is introduced wide-open, the uvula is encircled, and the handles are rapidly approximated.

MAX TOEPLITZ.

37. MUNGER, in addition to Müller's modification, desires the distal portion of the ring to present a heart-shaped appearance

thus allowing the posterior edge to straddle the posterior edge of the septum. This modification closely resembles that shown by Politzer at a meeting of aurists in London.

MAX TOEPLITZ.

38. These scissors, with a handle like that of Loewenberg's forceps, only lighter, with a French lock and a guard near the finger-ring to prevent overaction, are $\frac{3}{4}$ inch in length, slightly curved with the concavity forward and rounded at the tip, and are best used in conjunction with a palate retractor. They are used for separating adenoids forming adhesions to the Eustachian tube, in extremely tough hypertrophies of the pharyngeal tonsil, and for trimming irregularities upon the pharyngeal wall after operation with other instruments.

MAX TOEPLITZ.

39. GIBBONS devises perforated metal tubes, flat and crescentic, in fifteen sizes, corresponding to those of Sajous' bougies. Their advantages are as follows: They allow (*a*) normal respiration, (*b*) applications to the mucous membrane, and (*c*) discharge of the secretions. They are valuable in most cases of nasal stenosis, especially in that of hay fever. In epistaxis they are used instead of anterior and posterior plugging in conjunction with soft rubber tubes by means of a method which is minutely described in the original. The metal tube covered with rubber may also be used for the correction of deformities from fractures.

MAX TOEPLITZ.

EXTERNAL EAR.

40. LANNOIS, M. The auricle in healthy individuals (*Pavillon de l'oreille chez les sujets sains*). Lyon, 1892.

41. WATERS, RUDOLPH. Large cavernous angioma, involving the integument of an entire auricle, successfully treated by dissection, free resection of the diseased tissue, and ligation of the different trunks in situ by a special method. *Med. News*, Dec. 22, 1892.

42. GUERMONPREZ and COCHERIL. Three operations of epithelioma of the auricle, followed by autoplasty. *Revue de laryng.*, etc., No. 19, 1892.

43. GILLIS, P. Dermoid cyst of the mastoid region. *Bull. de la soc. d'anat.*, Paris, March, 1892.

44. SHEILD, MARMADUKE. Cystic tumor of the auricle. *Med. Soc. of London*, Nov. 14, 1892.

45. ROUSE, E. R. Hæmatoma auris among the insane. *Lancet*, Dec. 3, 1892.
46. GRADENIGO, Prof., Turin. A case of symmetrical perichondritis serosa of the auricle. *Archivio Ital. di Otologia*, vol. i., p. 57.
47. ALBESPY, RODOZ. Cyst of the auricle. Operation. Recovery without deformity. *Revue de laryngol.*, etc., No. 24, 1892.
48. SECCHI. A new case of otolith. *Archivio Ital. di Otologia*, vol. i., p. 49.
49. SILT. The dangers of manipulations made for extraction of foreign bodies from the ear. *Revue gén. de chir. et de thérap.*, March 1, 1892.
50. RYAN and BARRETT. The use of mercury in foreign bodies. *Lancet*, Oct. 15, 1892.
51. VEIT, JUL. Clinical contributions to traumatic ruptures of the membrana tympani. *Münch. med. Abhandl.*, 1892.
52. DAVIDSOHN, Berlin. Fibrinous membranes in the external meatus after influenza otitis. *Deutsche med. Wochenschr.*, No. 41, 1892.
53. ROOSA, D. B. ST. JOHN. A case of exostosis of the external auditory canal. Removal. Considerable improvement in the hearing power. *Trans. Amer. Otolog. Society*, 1892.
54. BUILLET ET CADIOT. Observations and experience upon "otocariase symbiotique" in carnivora. *Soc. de biologie*, June 6, 1892.
55. LAVERAN. Acaricus of the ear in the hare; reflex paraplegia. *Soc. de biologie*, Feb. 27, 1892.
40. LANNOIS examined the auricle of two hundred and fifty normal persons, and found his former view to be confirmed by these investigations, that the anomalies of the ear are too frequent in healthy individuals to ascribe great importance to them if found in criminals.
41. In WATERS' most interesting case, a man of thirty-two presented a sudden transformation of a nævoid spot into a large and rapidly growing angioma, which involved the whole of the integument of the auricle throughout its entire thickness with consequent hypertrophy of the cartilage. There was a preponderance of arteries in the morbid tissue. He first ligated the external carotid, which gave a cure for a time, but on re-establish-

ment of collateral circulation the trouble returned. Injections of carbolic acid gave relief, which however was not permanent. This auricle was then constricted by a septum of pins and ligatures at its base, which completely cut off the circulation and rendered cocaine anæsthesia perfect. The diseased integument was then carefully dissected off and the afferent arteries ligated in situ. The cartilage was left perfectly bare, but its vitality was not seriously interfered with, and recovery took place, which has remained the same for eight months. The ear is still slightly larger than its fellow and of a dull bluish-red color, but there is neither pulsation nor tendency to a return of the former condition.

SWAN M. BURNETT.

42. GUERMONPREZ and COCHERIL describe three cases of epithelioma of the auricle, which they had operated in the following manner. The tumor was removed, the surrounding parts were carefully curetted, and affected pieces of cartilage subperi-chondrically excised. In order to avoid a deformity of the auricle and to reconstitute its natural form, a cuneiform isosceles portion with its base toward the antihelix was excised through the entire width of the auricle. The healing took place per primam intentionem. The result is very satisfactory, as can be seen from the appended drawings.

BOK.

43. GILLIS demonstrated a cyst, which had been situated between auricle and mastoid process at the neck and had pushed the ear forward. It had a fibrous pedicle, which had entered the external meatus, in order to be inserted upon the postero-superior portion of the osseous wall of the external meatus. It contained caseous masses and hair. The author brings the cyst into relation with the development of the first branchial fissure.

GELLÉ.

44. MARMADUKE SHEILD exhibited a cystic tumor of the auricle in a man aged forty-four, which had been in existence for the last twenty-eight years, and which was probably sebaceous in origin.

45. In a short note ROUSE gives his experience of hæmatoma auris among the insane. He thinks that the "insane ear," as it is sometimes called, is more frequent in acute mania and in the maniacal stage of general paralytics, than in other forms of insanity, and that the right ear is most commonly the one affected. The violence, which is the almost necessary exciting cause, may, however, be exceedingly trivial. Cases which develop this condition are usually much more rapid in their course than others.

Further, Rouse is of the opinion that it is seen more commonly in private institutions than in public asylums. He also thinks that it may very frequently be produced in sane people, especially in athletes, and is not of necessity associated in any case with degeneration of the arteries.

46. GRADENIGO mentions the heretofore known observations of tumors of the auricles with serous contents, as they were described principally by Hartmann. He divides them into : 1. sequelæ of hæmatoma ; 2. sequelæ of purulent, and 3. of serous perichondritis. He compares the latter with the serous gatherings upon the nasal septum, as had been described by Jurasz and Rousseau. The case observed by Gradenigo occurred in a robust young man, in whom serous cysts formed without demonstrable cause, at first in the right and two months later in the left auricle, completely symmetrical on either side in the region of the crura antihelicis. The contents were serous from the very beginning, without a trace of hemorrhage or suppuration. The bacteriological examination gave a negative result. Gradenigo explains the development by trophic disturbances.

GRADENIGO.

47. In the introduction ALBESPY discusses the difference between aural cysts and othæmatoma in accordance with Hartmann's views. It follows the description of his case. The operation was made in the following manner : incision of the cyst, exceedingly careful curetting of the surrounding parts whereby a portion of the cartilage was removed, and galvanocautery of the remaining cavity. The healing took place without deformity under compressive dressing.

BOK.

48. The microscopical and chemical examination of an otolith removed by SECCHI from the ear of a man, aged twenty-one, affected with purulent otitis media, resulted in the fact that the nucleus consisted of cotton with mycelia of a hypho-mycetes, which could not be diagnosed. In addition pavement epithelia and lime salts were found.

GRADENIGO.

49. The operative interferences were made in three stages as follows : First, injections of lukewarm water, with the auricle pulled backward, or rather the head of the patient brought into an inclined position. Secondly, if this is without avail, small hooks and forceps may be used but only if the use of instruments is familiar to the physician. Finally, if these procedures fail, the auricle may be ablated, the membranous meatus incised, and

if necessary the osseous posterior wall partially removed with forceps and chisel. GELLÉ.

50. In a former issue the attention was drawn to a somewhat remarkable case recorded by Marmaduke Sheild, in which a mass of lead in the ear had been successfully removed by the use of metallic mercury. RYAN and BARRETT point out that metallic mercury has no such solvent action upon pure lead, though the ordinary plumber's solder, which contains one part of tin, loses nearly fifty per cent. of its weight on exposure to the action of mercury, and that the method has failed in a case of their own in which a bullet had become impacted in the meatus. They also suggest that Sheild's success may have been due to some slight inflammation round the edges of the impacted mass, rather than to the action of the mercury. Sheild replied by admitting that the mass in question was ordinary plumber's solder, and points out that he first saw the patient six weeks after the accident, when there were so signs of inflammation round the edges of the lead; that repeated use of syringes with various-shaped nozzles had, prior to the use of the mercury, entirely failed to move the impacted mass, whereas the first application of an ordinary syringe, after the use of mercury, was rewarded with success.

51. VEIT'S paper is based upon forty-three ruptures of the membrana tympani, which were observed at the surgical polyclinic at Munic among 6,500 aural affections (0.66 per cent.). Among these forty-three ruptures were four direct ones, produced by a penetrating body, twice in the antero-inferior, once in the antero-superior quadrant, and once at the boundary line between the antero-inferior and the postero-inferior quadrant. Seven ruptures occurred through extension of a fracture of the bones of the skull to the membrana tympani and also through intense concussion (stroke of a hammer upon the head). In thirty-two cases the rupture took place by sudden rarefaction of the air in the external meatus, twenty-seven of these by blows to the ear, four by detonations, one by a blow during bathing. In twenty-one cases of the latter category, the seat of the perforation was ascertained to be in the anterior half, in four superiorly, in eleven inferiorly, in the posterior half in five. Among the forty-three ruptures, ten were associated with concussion of the labyrinth. In one case a large perforation was closed by the interior membrane of the shell of a chicken's egg.

52. DAVIDSOHN removed by injections gelatinous structures,

$1\frac{1}{2}$ cm long and $\frac{1}{2}$ cm thick from the external meatus, consisting for the greater part of fibrine fibres, between which round cells were embedded, in the interior parts isolated, in the marginal portions in groups. In addition, numerous micrococci were found. The author contradicts the view of "croupous inflammation" of the cutis (Bezold) and asserts the existence "either of blood in the external meatus or lymph discharged from excoriations of the meatus and membrana tympani, or of both fluids combined, from which fibrine is exuded under certain conditions." Such conditions may be due to organisms in the external meatus, or their products of disintegration, to the epithelia thrown off, and perhaps to the influenza itself. NOLTENIUS.

53. ROOSA's patient was a rather delicate woman of forty-six years, in whom there was no history of gout or syphilis. A tumor in the right auditory canal was discovered two years ago. Hearing distance in this ear $h = \frac{c}{40}$, bone-conduction longer and louder than air-conduction on that side. The tumor sprang from the posterior wall, filled the lumen of the meatus, and was sensitive to the touch. In its removal a sharp gouge and hammer were used and after a few taps it separated at its base and was drawn out by a hook. Very slight hemorrhage followed. Hearing distance increased to $h = \frac{6}{40}$. SWAN M. BURNETT.

54. This affection occurs principally in the dog, cat, and ferret. It develops from cerumen in the external auditory meatus, upon the surface of which small grayish-black spots are formed. The effect differs according to the age of the animal. The young animals readily succumb under nervous symptoms, which resemble reflex epilepsy; they do not eat, and die. The affection when recognized can be easily cured by lukewarm irrigations and injections of calcium sulphuricum. The disease can be readily transferred from one animal to another. The parasites are larger in the dog than in the cat, and larger in the cat than in the ferret.

GELLÉ.

55. LAVERAN observed in a rabbit for two months paralysis of the backside and scabies in the ears. The cerumen was examined during the autopsy. The naked eye distinguished small, movable, whitish granules, acarus parasites. These were very numerous at the bottom of the external meatus. The middle ears were normal, and also the cerebro-spinal centres. According to Laveran there existed a reflex paralysis. GELLÉ.

MIDDLE EAR.

56. LUBET-BARBON, Paris. Cocaine as an anæsthetic for operations of the middle ear. *Soc. paris. de laryng. et otol.*, Dec. 2, 1892.

57. WOLFENSTEIN, JULIUS. Cocaine in the treatment of acute inflammations of the ear. *N. Y. Med. Jour.*, Nov. 5, 1892.

58. DELSTANCHE, CH. Note on the use of vaseline in the treatment of certain affections of the middle ear. *Acad. royale de méd. de Belgique*, 1892.

59. THEOBALD, SAMUEL. The value of weak solutions of bi-chloride of mercury in the treatment of otitis media suppurativa. *Trans. Amer. Otol. Soc.*, 1892.

60. RONNIER, M. Note on the mechanism of the opening of the Eustachian tubes in a case of naso-pharyngeal and palatine alterations of syphilitic origin. *Soc. paris. d'otologie*, Dec. 2, 1892.

61. SCHEIBE, ARNO. Bacilli of influenza in otitis media. *Munch. med. Wochenschr.*, No. 14, 1892.

62. MONNIER. Early paracentesis of the membrana tympani in otitis media acuta simplex. *Annal. des malad. de l'oreille*, etc., No. 10, 1892.

63. HOFFMANN, R. Chronic otorrhœa. *Correspondenzbl. des allgemeinen ärztl. Vereins von Thüringen*, No. 7, 1892.

64. BLAKE, CLARENCE. Suppuration of the middle ear. *Trans. Amer. Otol. Soc.*, 1892.

65. RAYMOND and NETTER. Suppurative otitis; infectious pseudo-rheumatism. *Bull. med.*, p. 119, 1892.

66. RANDALL, B. A. Excision of membrane and malleus for catarrhal deafness, followed by suppuration, mastoid empyema, and burrowing abscess of the neck. *Trans. Amer. Otol. Soc.*, 1892.

67. GRUNERT. Further communications on malleo-incudal extraction with especial reference to the diagnosis of incudal caries. *Arch. f. Ohrenheilk.*, vol. xxxiii., p. 207.

68. RANDALL, B. A. Preliminary notes on craniometric studies in relation to aural anatomy. *Trans. Amer. Otol. Soc.*, 1892.

69. CHEATLE, ARTHUR H. The mastoid antrum in children. *Lancet*, Dec. 3, 1892.

70. URBANTSCHITSCH, Vienna. Electric transillumination of the mastoid process. *Wiener klin. Wochenschr.*, No. 21, 1892.
71. OROGOZO. Indications for the opening of the mastoid process in infectious otitides. *Thèse*, Paris, 1892.
72. POLITZER, Prof. Perforation of the mastoid process in cases of influenza otitis. *Brit. Med. Jour.*, Dec. 31, 1892.
73. HAUG. Operative cases of mastoiditis occurring in tuberculosis and morbilli. *Arch. f. Ohrenheilk.*, vol. xxxiii., p. 164.
74. UCHERMANN. Cholesteatoma of the mastoid process. *Norsk. Magaz. for Lægevidensk.*, No. 4, 1892.
75. BLAKE, C. J. Mastoid cases. *Trans. Amer. Otol. Soc.*, 1892.
76. BACON, GORHAM. A case of mastoid disease following an operation for the removal of adenoid vegetations. *Trans. Amer. Otol. Soc.*, 1892.
77. KIPP, C. J. A case of purulent inflammation of the middle ear with double optic neuritis, but without tenderness of, or spontaneous pain in, the mastoid process, in which the opening of the mastoid cells was followed by a rapid subsidence of the optic neuritis and cure of the ear disease. *Trans. Amer. Otol. Soc.*, 1892.
78. POMEROY, O. D. Eight cases of mastoid disease, exhibiting somewhat extensive carious processes. *Trans. Amer. Otol. Soc.*, 1892.
79. KNAPP, H. A case of chronic purulent otitis media; old pulmonary tuberculosis; opening of the mastoid. Death from acute basilar meningitis. Autopsy. *Trans. Amer. Otol. Soc.*, 1892.
80. ROOSA, D. B. ST. JOHN. Wound of the lateral sinus during an operation upon the mastoid process in a patient with phthisis pulmonalis. Septicæmia. Recovery. *Trans. Amer. Otol. Soc.*, 1892.
81. SUTPHEN, T. Y. Result of opening the mastoid in a case of chronic middle-ear suppuration with cerebral complications and septicæmic symptoms. Recovery. *Trans. Amer. Otol. Soc.*, 1892.
82. EMERSON, T. B. A case of pyæmia following acute suppurative otitis. Recovery. *Trans. Amer. Otol. Soc.*, 1892.
83. ALLPORT, FRANK. Purulent brain deposits and phlebitis

and thrombosis of the cerebral veins and sinuses following ear disease. *Four. Amer. Med. Assoc.*, Oct. 18 to Dec. 31, 1892.

84. BRIEGER, ARTHUR. Contribution to the pathology and treatment of sinus thrombosis in affections of the middle ear. Dissertation, Würzburg, 1892.

85. STRAZZA, Genoa. A case of labyrinth necrosis with apparently preserved function of hearing. *Il Sordomuto*, p. 91, 1892.

86. PYE-SMITH. A case of cerebral abscess secondary to otitis media, and followed by pyæmia and death. *Lancet*, Dec. 24, 1892.

87. Prof. GRADENIGO. Deafness and deaf-mutism in non-suppurative otitis media. *Il Sordomuto*, No. 1, 1892.

88. JACK, FREDERICK L. Remarkable improvement in hearing by removal of the stapes. *Trans. Amer. Otol. Soc.*, 1892.

89. STETTER, Koenigsberg. Contribution to the operative treatment of deafness in consequence of impediments of sound conduction. *Monatsschr. f. Ohrenheilk.*, etc., No. 8, 1892.

90. POLI. The mobilization of the stapes. *Il Sordomuto*, p. 61, 1892.

56. Among thirty-one cases of aural affections, in the treatment of which cocaine was used (solutions of 1:5 or 1:4 were for five or ten minutes in contact with the membrana tympani, which was partially perforated or imperforate), the author had observed that in six cases of sclerosis of the membrana tympani the perforation could be made without pain, but that tenotomy of the tensor was painful. Three paracenteses of the drum-membrane, seven cuttings through the posterior fold at two places on account of adhesions in consequence of chronic catarrh of the Eustachian tubes, six removals of polypi, six malleolar extractions, were made with complete anæsthesia. The author believes that by means of establishing complete anæsthesia with cocaine, it will be possible to perform exploratory paracentesis more frequently. Gellé and Potiquet point out the accidents following the use of cocaine, which consisted in one case of prickling in one half of the tongue, in another case in angina præcordialis and vertigo. The strength of the solutions used in the first case was 1:5, in the second case three to four drops of a solution of ten per cent. GELLÉ.

57. WOLFENSTEIN reports that he has used a five per cent. solution of the hydrochloride of cocaine in about 100 cases of

acute otitis media and found it not only analgesic but curative when used in the early stage. Only five per cent. of the cases going on to suppuration. The instillation should be made every two or three hours.

SWAN M. BURNETT.

58. DELSTANCHE reports additional extremely favorable results from injections of fluid vaseline through the catheter into the middle ear. Even when combined with iodoform it never produced the slightest local reaction. In adhesions of the membrana tympani better action was observed from forced injections than from the aërial douche. Injections were also successfully used in exudative catarrhs of the middle ear. Delstanche used in either case a syringe containing about four grammes, the contents of which were more or less forcibly discharged through the catheter into the Eustachian tube. Delstanche thus explains the action of the fluid surrounding the aural structures, that it deprives them of their tendency to form adhesions. In acute inflammations of the middle ear injections of pure vaseline or especially of that with iodoform produce immediate decrease or cessation of pain and cessation of inflammatory processes.

59. THEOBALD has had a satisfactory experience in treating some cases of otitis med. suppur. with weak solutions (1 to 8,000) of bichloride of mercury. The ear is syringed with this generally not oftener than once a day.

SWAN M. BURNETT.

60. In consequence of syphilis the cartilages of the alæ nasi, a large portion of the palate, vomer, and velum had been destroyed. Upon each side of the pharynx two thick, fleshy cords descended to a sinus at a level with the completely distorted arytenoid region. In extreme yawning, the tubopharyngeal fold became marked, and the mouth opened slightly down and inward. Auscultation with the otoscope demonstrated that the air entered the tympanic cavity at the same moment. The patient, when singing a tone in yawning, experienced autophony, which was distinctly recognized by the observer from the resonance and the secondary movement of the membrana tympani.

61. SCHEIBE, during the last epidemic of influenza, found in the secretions of acute otitides the same bacilli as during the preceding one (*Centralbl. f. Bacteriol. u. Parasit.*, 1890, No. 8. "Bacteriological Contribution to Otitis Media in Influenza"), whereas they had been missing in genuine acute otitis media investigated in the intermediary period. He did not succeed in

producing pure cultures according to the ordinary methods. Scheibe considers these bacilli unquestionably as the exciting cause of influenza. Since Pfeiffer, Ritasato, and Canon also had not been satisfied with the ordinary methods for cultivating influenza bacilli, he thinks to be justified in assuming, that his bacilli are identical with those cultivated according to especial methods by these authors. The difference in size and form may be explained by analogous relations found in other kinds of bacilli (degeneration).

MÜLLER.

62. MONNIER performs paracentesis of the membrana tympani in all cases, in which Politzeration alone had not cured the patient, since tension and tinnitus disappeared and the normal relation between bone- and air-conduction returned.

GELLÉ.

63. HOFFMANN's paper represents the views held and the procedures taken at the aural clinic at Jena. After elaborate discussion of the various symptoms of chronic otorrhœa (suppuration, location, and form of perforation, caries of the walls, formation of polypi), Hoffmann proclaims as therapeutic principle the consideration of the hearing function, in addition to the removal of all diseased processes. He insists upon Kessel's priority with reference to the excision of the membrana tympani and ossicles and enters into the discussion of the different therapeutic measures and their special indications, for which we refer to the original. (We regret exceedingly that this noteworthy paper has been published in an almost unknown journal.—Reviewer.)

ZARNIKO (Hamburg).

64. The gist of BLAKE's paper which is written in the highest scientific spirit is that while we remove the malleus and incus for suppurative disease of the tympanic cavity primarily, and only expect a good result upon hearing power in proportion as this removal increases the mobilization of the stapes,—when we wish in non-suppurative disease to improve the hearing power, we must attack the stapes directly and it may be solely.

SWAN M. BURNETT.

65. A man aged forty-three, of robust constitution, suffered for fifteen years from otorrhœa of the right side. On January 12th chills, fever, articular pain. The physician diagnosed acute articular rheumatism. On January 18th the patient was admitted to the hospital. Typhoid condition, movement of the large joints extremely painful; joints reddened and swollen. On January 22d, death during collapse. Autopsy revealed arthritis suppurativa.

tiva multiplex, broncho-pneumonia terminalis. No suppuration in other intestines, offensive pus in the right ear. The examination resulted in a pure infection with streptococcus pyogenes. The terminal broncho-pneumonia only was caused by pneumococcus simultaneously with pneumobacillus. In the aural suppurations, streptococcus was found simultaneously with numerous kinds of bacteria. This is a case of chronic otorrhœa, produced by streptococci and complicated with infectious pseudo-rheumatism.

GELLÉ.

66. RANDALL removed the drumhead and the malleus in a young man who was almost deaf from long-standing and progressive catarrh of the drum cavity. The operation was somewhat difficult and the incus was displaced upward and not rescued. There was no immediate reaction, but on the third day a violent suppurative otitis set up which led to a mastoiditis and a burrowing of pus in the neck from which he, however, made a final recovery, but without any improvement in hearing.

SWAN M. BURNETT.

67. GRUNERT's paper is a continuation of the reports published by Ludewig in the *Arch. f. Ohrenheilk.*, vols. xxix. and xxx., supplementing the statistics on the cases operated by Schwartze up to the beginning of 1892. For the decision of the question, whether the malleo-incudal extraction alone was sufficient for the cure of certain chronic aural suppurations or not, Grunert excluded twenty-two among seventy-five cases operated by Ludewig, viz., nineteen cases which were immediately followed by chiselling of the mastoid antrum, and three cases in which the incudal extraction had failed. Twenty-eight of the remaining fifty-three cases had recovered when Ludewig's paper was finished. Grunert submitted, after $1\frac{1}{4}$ to $1\frac{3}{4}$ years, Ludewig's cases to an exact examination, and found: among the twenty-eight cured cases twenty-two permanent recoveries, two relapses of the suppuration, and four cases untraceable; among the twenty-three cases designated as non-cured, subsequently two recovered spontaneously, two were cured by chiselling, and seventeen were not cured at the time, two cases were not traceable. Grunert excludes from the statistics of his cases: 1. thirty-three cases in 4 of which the malleo-incudal extraction from the external meatus was immediately followed by the typical opening of the mastoid process, and in 29 of which Stacke's modification of chiselling the antrum was

performed. 2. Fifteen cases (50 *per cent. of all*) in which the typical malleo-incudal extraction (bleeding at the bottom, too narrow meatus) failed, viz., the incus, in twelve cases, could not be removed; in three cases neither malleus nor incus. "It is remarkable that in almost three quarter of these cases recovery took place, and that even in two cases in which the extraction of the malleus and the incus failed, recovery also occurred." Grunert explains this by the fact that the secluded malleo-incudo-squamal cavity (attic), the isolated site of the caries which produces suppuration, is usually widely opened, or even entirely destroyed, by the attempts at extraction. Finally four cases of chronic sclerotic catarrh of the middle ear are to be excluded in which an attempt was made to produce an improvement of hearing by the malleo-incudal extraction. Grunert reports twenty-eight cases which are detailed, and illustrated by twenty drawings of the condition found by otoscopy. The otorrhœa had in most cases developed in childhood, in three cases only after the beginning of puberty. Acute infectious diseases were mentioned as causes in twelve cases. The result of the malleo-incudal extraction consisted in thirteen cures, thirteen failures, and two cases still under treatment. With reference to the function the operation resulted in: no marked impairment of hearing, not even in the case in which the stapes also was unintentionally removed, but marked improvement of hearing in ankylosis of the malleo-incudal joint, complicating the caries. The pathological condition was as follows: in the twenty-eight collated cases the malleus was found to be normal in thirteen, the incus only in three cases. Both ossicles were normal in two cases, and both were carious in fourteen. 2. In all cases of isolated incudal caries the malleo-incudal joint was intact. 3. The long process of the incus appears to be an especial place of predilection. 4. The complete destruction of the carious incus by granulations appears to be much more frequent, or rather to occur much more rapidly than that of the carious malleus. With reference to the diagnosis Grunert mentions that we had the not unfrequent opportunity to observe otoscopic pictures, which appeared to be typical of the presence of incudal caries, and in such cases the diagnosis was usually confirmed by the condition found during operation. With reference to the dangers from the operation it is stated that exitus letalis did neither directly nor indirectly occur through the operation. Among seventy-one

cases facial paralysis occurred twice. Severe and persistent vertiginous phenomena were not observed by Grunert. The stapes was unintentionally extracted in two cases. The incus hook devised by Ludewig was exclusively used for operation. Grunert argues against Stacke's method as follows: It is true that 50 per cent. failures took place by the removal with the hook, but in thirty-three cases operated according to Stacke, the removal of the incus with the forceps failed also in eighteen cases. In narrow meatus of some cases even the chisel could not be relied upon, on account of the danger of fatal accessory injuries. Finally, a slighter operative interference should be preferred as long as it seems sufficient, viz., in isolated caries of the ossicles to operate from the external meatus.

RUMLER.

68. RANDALL gives in a table the measurements in detail of 122 skulls as a preliminary contribution to his more extended studies upon the subject, and deduces from these that Koerner's hypothetical law is not constant by any means, but that as a general rule the lateral sinus is apt to be larger and more superficial on the right side, and the room for operation on that side may be a little less. It is evident, too, that minimum results may be found on either side, and in any form of skull.

SWAN M. BURNETT.

69. CHEATLE gives a careful account of the mastoid antrum in children. His conclusions confirm those of some other observers, viz., that both developmentally and anatomically the antrum must be regarded as part of the middle ear, serving to secrete and store a lubricating material for use in the tympanic cavity, and he suggests that as the present name is misleading, it might more appropriately be termed the "tympanic receptaculum." A point of some practical importance, brought out by Cheatle, is that a small bony tubercle may often be felt close to the attachment of the auricle, separated from the mastoid process by a slight groove, and that if a hole be drilled straight in at this tubercle, it will open into the antrum.

70. URBANTSCHITSCH found in diseased, transilluminated mastoid processes, a considerable decrease of transparency, which was even entirely missing. In three cases the diagnosis was confirmed by the operation. In one case of wellnigh complete absence of transparency of the mastoid process, the transparency gradually returned with the decrease of inflammation. The

method does not admit of a positive diagnosis, and is of value only with simultaneous consideration of other phenomena.

71. OROGOZO arrives at the conclusion that, in acute, infectious otitis, the opening is indicated: 1. If the infectious character of the lesion is ascertained, leading to accelerate the time of perforation on account of rapid action of suppuration. 2. If the acute symptoms intensely persist at the usual time of abatement, unless the other ear becomes infected. 3. If, after closing of a spontaneous perforation or paracentesis of the membrana tympani, symptoms occur from the mastoid process. 4. If, the topical symptoms of purulent otitis being absent, cerebral symptoms appear on the tenth, fifteenth, and twentieth day, whereas the disturbance of the ear itself does not account for them. 5. If the fever suddenly rises in the course of acute otitis, after the severe fever phenomena had ceased. If, in swelling of the mastoid with deep-seated fluctuation, an osseous fistula is found after Wilde's incision, the too narrow canal should be enlarged. If, after Wilde's incision, an osseous fistula is not found, the views differ on the measures to be taken. It seems, however, to be more correct to trephine the bone if the suppuration lasts several weeks and intense fever sets in. GELLÉ.

72. POLITZER's paper treats of perforation of the mastoid in cases of otitis media due to influenza. He considers that this condition, which occurs with exceptional frequency, is due primarily to the passage of pathogenic organisms from the pharynx. With regard to symptoms, Politzer points out that the pain is continuous and the mastoid very tender, but there is not of necessity, or even generally, any cutaneous infiltration in uncomplicated cases. In the same way, too, communication with the antrum does not always occur. With regard to treatment, he believes that if seen early we should try the effects of counter-irritants and antiphlogistics, but if these have no effect, or if the case is of some standing, we ought to make an incision over the mastoid and gouge away the superficial layer of bone, until we come down upon the seat of the pus.

73. I. Primary central tuberculosis of the mastoid, simulating neuralgia in the beginning. The diagnosis was very difficult, since no cause could be ascertained of the extreme pain in the mastoid in the patient, suffering from chronic, sclerotic catarrh of the middle ear, and no other external symptoms of inflammation were present than a small infiltrated gland upon the mastoid,

which was found to be extremely tubercular. HAUG thinks that the infiltration of this gland in primary central tuberculosis is to be considered as one of the earliest symptoms. II. Acute caries of the mastoid in consequence of morbilli, with remarks on the technique of permanent drainage of the operated mastoid. Haug emphasizes the frequency of acute affections of the bone after measles, and reports as evidence the following cases: *a*, Multiple perforation of the membrana tympani, and acute caries of the mastoid. On the sixteenth day after the beginning of otitis, on the seventh day after the beginning of mastoiditis, the operation was performed, and extensive necrosis of the bone was found. In order to keep the osseous wound open, Haug uses, to his extreme satisfaction, permanent canulas, made of hard rubber of the form of a short aural speculum, with a slight curve at its inner half directed toward the auditus ad antrum. The canula is thus enabled to be firmly fixed in its position. *b*, Bilateral acute otitis media, bilateral acute subperiosteal abscess and acute caries. *c*, Otitis media acuta sinistra before appearance of exanthem, acute empyema of the left mastoid with epidural abscess; caries of the malleus and incus. *d*, Acute primary empyema and caries of the mastoid; secondary inflammation of the tympanum.

RÜMLER.

74. UCHERMANN reports a case of cholesteatoma of the right mastoid process, which, after painless, intermittent, suppurative discharge of this ear, suddenly caused violent pain in the temporal bone and fever. There appeared pain upon pressure against the mastoid process and the tragus, œdema of the posterior and upper wall of the external meatus, and some cholesteatomatous masses at the bottom. White scar upon the mastoid process (after an abscess fifteen years ago), above which some œdema. Chiselling presented a cavity of the size of a chicken's egg of irregular form posteriorly, the sinus being exposed anteriorly, communicating with the osseous meatus, the posterior wall being carious. The cavity was filled with detritus, caseous masses, cholesteatomatous lamellæ, and some granulations springing from the walls. The further course ran without fever. The treatment was finally applied from the external meatus. Etiology, importance and mode of operation of the affection are briefly discussed.

UCHERMANN.

75. In the first six months of the year BLAKE has treated twenty-five cases of mastoid congestion; of these, three were

treated by the continuous cold coil with excellent effect. The twenty-two other cases came at last to operation. In three the wall of the sinus had to be removed, and in three the suppuration extended down into the tissues of the neck. Two cases died—one from meningitis, through the tegmen tympani, and one from pneumonia. Operative details the same as in the cases reported at the last meeting of the society, except that the rongeur was used to enlarge the opening in the cortex in a few instances. In two cases the mastoid cavity was allowed to fill with blood at the conclusion of the operation, and then irrigated superficially with water as hot as could be borne. These healed in five days and in a most satisfactory manner.

76. In BACON's case the otitis media purulenta set in after a rude attempt at removing adenoid vegetations, and this was accompanied with a mastoiditis, which was successfully treated with cold applied by means of a Leiter coil.

SWAN M. BURNETT.

77. KIPP's case is most interesting and instructive from the fact that there were none of the ordinary symptoms of mastoid disease, though there was a constant and long-continued flow of pus from a perforation in the upper part of the drumhead, and the walls of the meatus were swollen. In the course of time a pronounced double optic neuritis developed, which determined Kipp to open the mastoid. He found the cortex sound but a cavity the size of a hazel-nut filled with pus and granulations. Improvement set in immediately and the result was a perfect cure.

SWAN M. BURNETT.

78. The special points insisted on by POMEROV in these eight cases, which are reported at some length, were that no great effort was made to remove all the dead bone, only that which was loose and easily detachable being taken away. Antisepsis and drainage were carefully looked after and the nourishment was well cared for. In one case most or all of the petrous pyramid was thrown off. There was one death in the eight cases.

SWAN M. BURNETT.

79. KNAPP's case is interesting and most instructive from the fact that, whereas the history and symptoms pointed to intracranial suppuration, the autopsy showed the basilar meningitis (which was the immediate cause of death) to be due to tubercle and not to an extension of inflammation from the drum or mastoid cavity. Knapp had opened the mastoid and found it affected

with a sclerosing otitis. The lungs were studded with tubercle, the presence of which was not suspected during life.

SWAN M. BURNETT.

80. In ROOSA's case a young girl, affected with otitis suppurativa in the left ear for fifteen months, developed symptoms of mastoid disease, for which an operation was considered necessary. An opening in the bone was made with a trephine and exploration made with a Bowman's probe. Suddenly there was a gush of purple blood, which Roosa thought came from the lateral sinus. The wound was closed at once by means of an oakum plug. There set in almost immediately symptoms of pyæmia, which continued for two months, but from which she finally recovered with a cure of her ear trouble. In treatment no drugs were used except to quiet the pain.

SWAN M. BURNETT.

81. In SUTPHEN's case, a girl of sixteen years, there was a chronic suppuration of the left middle ear of long standing, upon which there supervened symptoms of septicæmia but without anything definite referable to the mastoid except pain. There was swelling of the retinal veins but no neuritis. There was a tender swelling of the neck extending from the ear downwards and beneath the sterno-cleido-mastoid muscle. The mastoid was opened, but only a few drops of pus were found. Some ten days afterward pus began to flow freely from the mastoid opening with an immediate improvement in the symptoms.

SWAN M. BURNETT.

82. In EMERSON's case, a woman of twenty-four years had an acute otitis media suppurativa sinistra following influenza. There was at no time any mastoid complication but she had well defined septicæmia affecting the lungs and numerous abscesses, chiefly along the sterno-cleido-mastoid muscle on that side. At the end of four months recovery took place. No treatment but rest, anodynes, and nourishment, with opening and antiseptic dressing of the abscesses. Temperature charts are given.

SWAN M. BURNETT.

83. ALLPORT has done a good service to otology by collating and tabulating the histories of 169 cases of ear disease in which the brain has been implicated. In his reports there was either a history of ear trouble with resulting intracranial affection, death, and an autopsy, or there was ear trouble with intracranial complication and the brain exposed by an operation. The first 6 cases whose histories are recorded are from his own practice. Some of

the results of this investigation can be summarized as follows : There were 86 men, 46 women, and in 37 the sex was not stated. More cases occurred between twenty-three and twenty-five years, but the average age was between nineteen and twenty. The right ear was the one affected in 81 cases, the left in 69, ear not stated in 19. The cerebral trouble followed upon chronic ear disease in 118 cases, upon acute aural disease in 10, not stated 41. The most frequent line of passage for the inflammation is through the roof of the tympanum, the next frequent is through the inner mastoid plate to the posterior cerebral fossa. The disease may proceed, however, by way of the internal ear and particularly through the semicircular canals. Almost all cerebro-aural pus deposits are accompanied by more or less meningitis. The abscess is seldom encapsuled. There is a detailed study of the symptoms pointing to cerebral disease, from which we learn that a sub-normal temperature may exist, but that it is not a necessary accompaniment ; nor is a high temperature usually observed. There were 158 deaths and 11 recoveries. The skull had been opened spontaneously or otherwise 21 times, and in these are comprehended all the recoveries, which is a good showing for operative interference. The special features characteristic of phlebitis and thrombosis of the lateral, cavernous, superior longitudinal, and superior and inferior petrosal sinuses and the mastoid emissary and facial veins are also considered in detail with their differential diagnostic features. This valuable paper will amply repay a careful study.

SWAN M. BURNETT.

84. Full and elaborate discussion of the relations of sinus thrombosis. Of the four histories given by BRIEGER, the last one is remarkable. In a case of acute purulent otitis media, the *bulbus venæ jugularis* is injured by galvano-caustic paracentesis (cp. Ludwig's and Hildebrandt's cases, *Arch. f. Ohrenh.*, 1892). The bleeding was stopped by plugging. On the fifth day pyæmia. On the ninth day exitus letalis.

ZARNIKO.

85. STRAZZA became convinced that, in a case of sequestrum of the cochlea with preservation of hearing, this was to be ascribed to the perception of the healthy ear.

GRADENIGO.

86. The case of cerebral abscess secondary to otitis media, and followed by pyæmia and death, reported by PYE-SMITH, occurred in a child, aged ten, with a history of discharge from the left ear for eighteen months, and acute cerebral symptoms for three days. The patient was trephined two days after admission

to the hospital, the mastoid antrum was freely opened, and pus was found in the cerebrum; death from pyæmia ensued on the ninth day after the operation. At the necropsy, in addition to the abscess cavity in the cerebrum, and secondary abscesses in the viscera, a septic thrombus was found in the left lateral sinus, extending down to the external jugular vein.

87. GRADENIGO refutes Boucheron's theory of otopiesis, and disputes that Rohrer's case was one of torpor of the perceiving apparatus caused by increase of pressure of the labyrinth; he is inclined to believe that this deafness was *anæsthesia acustica hysterica*, as in the cases described by Magnus, Bürkner, and Bayer.

GRADENIGO.

88. In the sixteen cases whose history JACK gives, the hearing for the human voice was improved for all, and in some in a very remarkable degree. The hearing for the watch and the Koenig rods was not always increased. The operation of removal of the stapes, which he describes and illustrates by drawings of the proper instruments, has not been followed in his hands by any serious or even unpleasant events. There was complaint in a few cases of dizziness for a few days, but nothing more. He advocates the removal of the stapes not only in connection with the other bones, when they are the subjects of disease, but independently and through a membrane that has no perforation, leaving the other bones in place. When he does this, he makes an inverted V-shaped incision in the membrane just over the stapediocudal joint, giving a good view of the long process of the incus. The stapedius muscle is then cut by means of a slender knife behind the bone. The stapes is then severed from its connection with the incus. If the stapes is not loose, it is made so by passing a small knife around its base. A small hook is then introduced behind the head of the stapes and the bone drawn out. It usually comes away with some suction.

SWAN M. BURNETT.

89. STETTER has produced improvement of hearing in three patients with sclerotic drum-membranes by passive movements of the handle of the malleus by means of a small hook introduced through an incision made posteriorly to it. In one patient even the bone-conduction, which had almost entirely ceased, was restituted. With reference to the diagnosis of sclerosis of the middle ear, Stetter remarked that he could not in *one* among 3,000 patients make it beyond any doubt.

KILLIAN.

90. After incising the upper posterior portion of the membrana tympani, POLI mobilizes the stapes by means of a small hook. The operative procedure is not connected with any danger.

NERVOUS APPARATUS.

91. BEAUREGARD. Note on the part played by Corti's organ in the hearing (Note sur le rôle de l'appareil de Corti dans l'audition). *Bull. Soc. de Biologie*, June 18, 1892.

92. BEAUREGARD. Note on the rôle played by the round window. *Ibidem*.

93. GELLÉ, Paris. Three observations of different disturbances of hearing following neuropathic conditions (Trois faits de troubles de l'ouïe liés d'une neuropathie). *Annal. des malad. de l'oreille*, etc., No. 12, 1892.

94. TSAKYROGLOUS, M., Smyrna. Contribution to the study of Ménière's disease.¹ From my own practice. *Monatsschr. f. Ohrenheilk.*, etc., No. 11, 1892.

95. MONGARDI. Contribution to the treatment of Ménière's disease (Contributo alla cura del morbo di Ménière). *Bolletino delle malattie dell' orecchio*, etc., No. 2, 1892.

96. ATKINSON, T. RENEL. A case of apparent double labyrinthine deafness. *Lancet*, August 27, 1892.

91. Corti's organ plays a part which has been differently explained. According to Helmholtz, the membrane vibrates directly through the influence of the vibrations transmitted through the fluid of the inner ear. According to Gellé the membrane receives simply and purely the stroke of the vibrations of the fluid. BEAUREGARD bases his views upon investigations made on different animals with acute and weak hearing and upon histological specimens of the inner ear. He thinks that Corti's organ plays a considerable part in the perception of tones; for in animals with extraordinary hearing faculty, this apparatus is of especial thickness and tension. It does not deaden the sounds, but rather intensifies them. GELLÉ.

93. GELLÉ describes different disturbances of hearing following a neuropathy on account of three characteristic observations. In all these cases there was a marked or weak disturbance of

¹ The paper was extensively published in Greek at the beginning of this year as a monograph, with an historical bibliography.—Moos.

hearing. This is secondarily affected and reacts abnormally, whereby the most serious attacks are caused ; the starting-point, however, of these unusual disturbances is located entirely without the ear and is of a more general character. Hence follows, how important such a diagnosis is for the treatment of hearing disturbances. The author believes that the peculiar changes in the hearing curve have a precise character in nervous deafness, even if extensive general disturbances are missing in nervous diseases.

GELLÉ.

94. TSAKYROGLOUS has observed as causes of Ménière's disease, colds, influenza, mumps and therapeutic influences. In two cases, the vertiginous attacks appeared simultaneously with muscular convulsions of the upper arm of the corresponding side. In one of them also the corresponding side of the face participated. The duration of the attack was quite different, lasting from minutes to days and months. The entire disease lasted in one patient seventeen years. The acute, apoplectiform cases took according to TSAKYROGLOUS, mostly a slow course, and frequently relapsed. He recommends for treatment quinine with ergot ($\bar{a}\bar{a}$ 0.6 to 1.0 daily) and iodide of potassium. KILLIAN.

95. MONGARDI recommends for treatment of Ménière's disease, bromide of potassium, 3.0 grammes pro die, in connection with iron salts. Mongardi prefers these remedies to quinine, since they act more positively and rapidly upon the hardness of hearing.

GRADENIGO.

96. ATKINSON describes the symptoms of a case of apparent double labyrinthine deafness. Additional interest is given to the relation inasmuch as the patient is Atkinson himself, and consequently the symptoms that he describes so graphically are entirely subjective in character. It appears that after a short period of slight premonitory tinnitus, Atkinson, one morning, was suddenly seized with vertigo, sickness, and violent tinnitus. He stayed in bed a week ; the vertigo and nausea gradually passed off, but the tinnitus, now associated with deafness in the right ear, remained. During the course of the ensuing three months, although able to go about his work as usual, various nervous symptoms developed ; these were mostly of an emotional character, but included also transient diplopia, slight elevation of temperature, numbness of the extremities, etc. In the fifth month, another acute attack almost identical with the first one, was experienced, the left ear being this time affected and remaining deaf. There does not ap-

pear to be any particular cause assignable for these attacks; the family history is good, and there is no personal history of severe injury, syphilis, or prolonged illness. The local condition is thus described: "Membrana tympani fair. Eustachian tube open to Valsalva. Vision normal; ophthalmoscopically normal." A variety of methods of treatment have been tried without much lasting success and Atkinson appeals to his professional brethren for further advice.

NOSE AND NASO-PHARYNX.

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97. A cold is not a mere local disturbance, but frequently ac-

accompanied by general symptoms. It is contracted at moderately low temperatures, just above freezing point, best in moist atmosphere and especially in form of a draught. It is frequently provoked by indigestion, principally by alcohol. SCHROEDER therefore tries to prevent and treat cold by general and hygienic measures, and also tries to abort it in the very beginning in the well known manner. He emphasizes the local treatment, but condemns the use of cocaine. Complications from the accessory sinuses and the remaining respiratory tract are properly attended to.

MAX TOEPLITZ.

98. Besides the well-known origin of cough, viz., lungs, pleura, larynx, and trachea, cough may be a reflex irritation from nasal disorders, adenoids of the naso-pharynx, elongated uvula, hypertrophied faucial tonsils, enlarged lingual tonsil and from irritation of the auricular branch of the pneumogastric, as aural cough. There is also a gastric and hepatic cough and a cough during puberty. Whooping-cough is not fully discussed.

MAX TOEPLITZ.

99. CISSIER mentions the occurrence of primary rhinitis erysipelatos. He believes that it may remain isolated in some instances and alone manifest the infection with streptococci. It begins with chills and fever, frontal headache, dull pain in the nape of the neck, and frequent epistaxis, which is followed by sensations of burning and dryness in the nose, complete obstruction, muco-purulent, frequently hemorrhagic, discharge, not very copious; the mucous membranes are extremely congested and diffusely swollen, of the color of yeast of wine, studded with ecchymoses. The head is comparatively immovable, slightly inclined to one side. Pain occurs spontaneously and upon pressure in the lateral and upper portions of the neck, and depends upon glandular affections consecutive to rhinitis erysipelatos. Relapses of erysipelas and principally of catamenial erysipelas, are in the same case not supposed to be new infections. It follows from the paper that the nose plays an important part in facial erysipelas, and that therapeutic and prophylactic measures should be taken.

GELLÉ.

100. The hemorrhage occurred in WATKINS' patient, æt. sixty-one, from the nose and occasionally from different localities, except lungs and stomach, at intervals for fourteen years, running two or three years at a time, and in large quantities, and had its inception in an attack of rheumatism early in life. Pathologically, increased blood pressure, diminished contractility of the vessels,

and retardation of the coagulating power of the blood have been found to cause the disturbance. These conditions, according to Sainsbury and Ringer, are due to deficiency of lime salts, and the clinical and spectroscopic examination of the blood as well as the treatment with lime water seemed to verify these statements.

MAX TOEPLITZ.

101. DELAVAN, while not believing that exophthalmic goitre, lymphadenoma, and the strumous or rheumatic diathesis form contra-indications to throat operations, strongly advises against such operations in persons with hemorrhagic diathesis or "hæmophilia." He quotes a fatal case from his private practice, occurring in a boy, æt. two and a half years, whom, after previous careful inquiry with negative result, he had operated for adenoid vegetations. The maternal grandfather and several other members of the same line of the family were subsequently found to have been distinctly hemorrhagic. He does not place much faith in galvano-cautery for the prevention of immediate or secondary bleeding. He advises rigid examination prior to operation, and in existence of hæmophilia, abandonment of operative interference. He considers Watkins' proposition (see the preceding paragraph) to be most welcome and worthy of trial.

MAX TOEPLITZ.

102. In an individual weakened by influenza, THORNER observed the development of thrush beginning with deposits, isolated at first but confluent later on, extending along the velum palatinum to the pharyngeal wall, and finally proliferating through the entire naso-pharynx and both nostrils. This remarkable localization of the affection proves that the view of the growth of thrush exclusively in pavement epithelium cannot be sustained.

ZARNIKO.

103. In the ordinary forms of chronic nasal catarrh (with swelling), vibratory massage has yielded satisfactory results. The result appeared to be doubtful in rhinitis atrophicans without odor and in ozæna, because in the former the improvement disappears after the cessation of treatment, and in the latter, massage does not prevent the return of crusts and odor without simultaneous injections. In hypertrophic catarrh ANTON did not observe any improvement from this method.

POLLAK.

104. FELICI attained satisfactory results with massage of the mucous membrane in acute and chronic affections.

GRADENIGO.

105. Oil of myrrh (1:1), also called myrrholin and myrrh

ointment (ten per cent.), are these new preparations. The latter, in acute and chronic eczema of the introitus narium, had the same effect as the usual ointments, and in form of nasal suppositories so much as to "justify an attempt at intercurrent treatment in persistent cases." Myrrholin was even less successful.

MÜLLER.

106. According to WINKLER operative intranasal interference is indicated: 1. In total obstruction of the nose by large adenoid vegetations, polypoid growths, or masses of polypi; occlusion of the posterior nares, extreme scoliosis of the septum, if it causes demonstrable or probable congestions in the vascular system of the adjoining organs, which are due to the severity of the disease. 2. In inflammatory alterations of the accessory cavities.

POLLAK.

107. OPPENHEIMER observed four patients in whom, after removal of large hypertrophies of the posterior extremities of the lower turbinated bodies, the menstruation returned and remained regular. Another patient with extreme chlorosis was treated with arsenic. Rapid recovery took place after removal of the hypertrophies.

RUMLER.

108. BRESGEN considers as the two main occasional causes of transmission of inflammations from the nose to the ear: 1, excessive and faulty blowing of the nose; and 2, impeded efflux of suppuration due to swelling and other occlusion of the nose. The first mentioned cause is equal to the abuse and mistakes made in the use of nasal douches and similar procedures. He warns against cauterizations during the first examination of the nose, or against bilateral cauterizations, and recommends strict attention to after-treatment. He advocates methylene blue for this purpose, which after two or three days should be followed by powdered *natr. sozodol*. In hemorrhages consecutive to nasal operations Bresgen warns against occluding the nose for more than twenty-four hours. He orders the frequent and regular use of an ointment of lanolin-anhydr. Liebreich, 25.0; paraffini liquid, 5.0; ol. ros., gutt. 1, to be drawn into the nose. If the hemorrhage is not rapidly stopped, Bresgen cauterizes with cotton applied to a platinum probe and imbued with a from 20 to 40 per cent. solution of chromic acid.

POLLAK.

109. WEIR tries to restore sunken noses without scarring of the face. He overcomes the deformity resulting from the *flattened* bony ridge by dividing the *ossa nasi* with a chisel, first in the

median line and subsequently by fracturing them at the line of their attachment to the superior maxilla; the sunken bridge is then raised and held *in situ* by a pin crossing the nose and secured by clamping on it a shot at each end. Chiselling may be done by small incision, bevelled in character or by the small engraver's chisel carried up through the nasal passages. In order to raise the sunken *central* cartilage, which is much more difficult, he inserted the sternum of a fowl, suitably trimmed; but had to remove it again after ten weeks. He was, however, more successful in three cases, by using an internal support of platinum, as first suggested by Martin of Lyons, the application of which is fully explained in the original. Weir also reports a case of monomania in a patient with an immense nose, intensely receding chin, and a diminutive mouth, whom he was urged to operate by three different operations for purely cosmetic purposes. TOEPLITZ.

110. Nasal hydrorrhœa is either due to injury to the brain, or is found in catarrhal subjects or such as have a marked neurotic temperament. BEAN reports three cases of the latter class, which closely resemble nasal reflex neuroses, and begin suddenly with sneezing similarly to hay fever. The attacks occur periodically or continuously, with puffiness of the nasal mucous membrane and frequently merge into bronchitis and asthma. Internal administration of antispasmodics are of more benefit than local remedies, even galvano-cautery and cocaine. MAX TOEPLITZ.

111. CHAPMANN selected sixteen cases with secondary affections of the upper air passages coincident with influenza. In two of the rheumatic-gouty cases and in one of spinal neurasthenia, aphthæ of the mouth and pharynx occurred, extending to the brim of the larynx. In one of the renal cases and in one of the former, laryngitis crouposa and sanguino-purulent naso-pharyngeal inflammation combined with acute tonsillitis and sympathetic enlargement of cervical glands took place. The swelling of the tonsils, threatening suffocation, was reduced by free incision. In a case of diabetes, intense congestion of the entire pharynx and œdema of the larynx did not disappear until after the lapse of three weeks from the time of onset. Among the eight spinal cases, five suffered from severe purulent naso-pharyngeal inflammation, one of tabes also from severe and dangerous hemorrhage and aphonia. MAX TOEPLITZ.

112. LIEVENS describes the histories of cases of a number of reflex neuroses of the eye (lachrymation, ciliary neurosis, bleph-

arospasm), which were partly cured, partly much improved by nasal treatment (galvano-caustic destruction of hypertrophies of the mucous membrane, removal of mucous polypi, excision of adhesions between turbinated body and septum, etc.).

NOLTENIUS.

113. The majority of cases in lunatics exhibit deviations of the nasal partition wall to the left, which may even lead to deformities. The deviation is almost invariably associated with thickenings of the curvature of a ribbed form. The nasal cavities are frequently affected by chronic catarrh. Hypertrophy of the mucous membrane, of the septum and turbinated bodies, frequently occurs as consequence of stenosis due to deviation of the septum.

GELLÉ.

114. DIONISIO observed two cases of nasal tuberculosis. In a case of a female, aged eighteen, a circumscribed growth was found upon the septum, which consisted of tubercular tissue. In another case ulcerated granulations were found in a peasant, aged twenty-two. In the first case permanent recovery took place.

GRADENIGO.

115. The entrance of the left nostril was partly taken up by an ulcerated tumor which was about the size of a 50-centime piece. The tumor was situated in the region of the quadrangular cartilage. Its syphilitic nature was not recognized before the appearance of the secondary phenomena.

GELLÉ.

116. The relative frequency of nasal polypi in children, as emphasized by HOPMAN in 1885 against the general concurrence of opinion, is now confirmed by his experience of later years, during which he had found up to the end of the year 1889 twenty-one nasal polypi in patients below sixteen years of age, viz., in four per cent. of all cases. Hopman distinguishes three forms of nasal polypi: mucous, fleshy, and raspberry polypi; the first being prevalent among children, although the others also occur. Among the mucous polypi he mentions especially the multiple ones, which may be extremely persistent and numerous (two cases), and the large, rapidly growing, usually unilateral, solitary naso-pharyngeal polypi, which can be quickly and completely removed according to Hopman's bimanual combined method, but return after long or brief periods. It seems, however, that relapses are unusual after puberty. Two tables of the heretofore observed cases are appended.

RUMLER.

117. The patient, a woman æt. forty-six, had even when a

little girl a red spot at the tip of her nose, but rather on her left side, which gradually increased with each pregnancy (seven altogether) during the latter months of gestation, without occasioning any inconvenience except slight tenderness to the touch. The inside of the nostrils presented the same redness and vascularity. The lesion was originally a *nævus*, which became hypertrophied, so as to form a fibroma, closely resembling elephantiasis. After its removal by means of a V-shaped incision and of galvano-cautery applied to the inside, the nose appeared almost normal.

MAX TOEPLITZ.

118. DREYFUSS describes a case of carcinoma of the nasal cavity, complicated by *ozæna* of thirty years' duration, and by empyema of all accessory cavities. The microscopical examination of the operated tumor had the following result: The entire covering is formed by pavement epithelium of several layers with slightly horny surface; the deepest layers consist of reeved cells with deeply stained nuclei. The subepithelial connective tissue is normal in the zone situated directly below the epithelium, but shows extensive small-celled infiltration farther below, around the neoplasma proper. There is not much left of the glands, and forms transitional from glandular to carcinomatous alveolæ are not found. The carcinomatous portions proper consist of atypically arranged epitheloid cells, which are stratified at many places in pearls and "onions." The epithelial covering is sharply limited against the connective tissue.

POLLAK.

119. A large concretion removed in narcosis by crushing, proved to consist chemically and microscopically for the greater part of calcified microbes with a small cotton pellet as a nucleus.

NOLTENIUS.

120. On account of two observations of rhinoliths SEELIGMANN gives a full and elaborate description of all their relations.

121. This work, like many other excellent books, offers many difficulties to reviewing. It contains so many new facts and the old ones are so fully discussed from other points of view as to make an exhaustive review as elaborate as the original. The greater part of the book treats of chronic empyema of the accessory cavities. From the general symptomatology we draw special attention to *ozæna*, polypi, and hypertrophies. The value, or rather the fallacy of transillumination for the diagnosis and treatment, the correct surgical principle of extensive opening and drying of the diseased cavity, are duly emphasized. The antrum

Highmori is treated somewhat briefly, its diseases being sufficiently well known from the abundance of other treatises. On the other hand, empyemata of the ethmoid and sphenoid cavities are fully treated, the frontal sinuses comparatively briefly. Such lack of uniformity may be faulty in a *text-book*, but is easily explained from the character of the treatise, which is based principally upon the author's own extensive experience, as evidenced by a selection of twenty-seven fully reported histories of cases. The author exhibits sharp observation, sound judgment, and correct, frequently cutting criticism. His argumentation, although not always quite in accordance with our views, is perused with great pleasure, as very suggestive and instructive. We highly recommend the perusal of this book to every practitioner, not only to rhinologists.

ZARNIKO.

122. Among the cases elaborately described by SCHWARTZ, one is remarkable, in which after puncture of the antrum Highmori from the lower nasal meatus, about twenty drops of a transparent fluid escaped. In two other cases peculiar disturbances of vision existed, the musculi recti interni being so weakened as to render accommodation for the near distances of long duration impossible for reading and embroidering; in addition scotomata were noticeable.

KILLIAN.

123. The suppurating antrum Highmori had been opened by extraction of the first molar tooth, so as to enable the patient to suck out the pus readily and regularly. In the course of three years recovery took place without further interference.

KILLIAN.

124. REPP's dissertation (150 pages) contains a very complete bibliography and an elaborate discussion of all relations pertaining to the subject.

125. For the diagnosis of suppuration in Highmore's antrum the author recommends exploratory puncture with a thick troicart of the external nasal wall in the lower nasal meatus with subsequent irrigations. If this method fails, *e. g.*, in consequence of thickening of the external bony wall, CHIARI performs puncture according to Ziem from the alveolar process. He discusses also the other method according to Hartmann, *viz.*, irrigation from the orificium sinus maxillaris, but was successful only in a very few cases. Five histories of cases are added.

BOK.

126. The empyema of the frontal sinus operated by VALUDE was associated with marked cutaneous swelling and loss of sub-

stance of the bone toward the orbita. The anterior wall of the frontal sinus was trephined, the cavity scraped, disinfected, and drained by a double drainage-tube. Rapid recovery.

127. RANKIN dwells fully upon the anatomy of the sinuses, and, after enumeration of their different affections, details a case of gunshot wound immediately over the sinus. The injury, contracted in the civil war, had healed, leaving severe deep-seated pain in the forehead, which was immediately relieved after trepanation of the skull and evacuation of pus. Another instance of empyema of the sinuses, due to the gripe, occurred in an acute form with agonizing pain over the sinus, which was not relieved by anodynes and antiphlogistic remedies, but upon appearance of delirium, most successfully cured by opening of the outer table and discharge of $\frac{1}{2}$ ounce of healthy pus. Bibliography.

MAX TOEPLITZ.

128. On account of fifteen observations of his own, WINKLER fully discusses the etiology, symptomatology, diagnosis, and treatment of empyema. With reference to the first, among fifteen cases (two in males, thirteen in females, at the ages of from seventeen to fifty-two years), two cases were caused by strokes against the forehead, three by influenza, and one each by lues and ozæna. Six cases were permanently cured, three are still under observation; four improved, but stayed away; and two are still under treatment. In the majority of cases the pain was localized in the region of the sinus, the corresponding eye being frequently implicated, and almost all complained in addition about impediments of the nasal respiration, and only two about fetor. In seventeen cases only the suppuration was demonstrated by rhinoscopy; in six cases it was even impossible by irrigations under strong pressure, according to Ziem. In three cases there existed swelling and redness of the frontal integument, and in eight cases sensitiveness to pressure upon the supraorbital nerve. Percussion had throughout a positive result, transillumination was of lesser advantage. With reference to the treatment, Winkler has not made use of the anatomical orifice, after many experiments on twenty-six skulls, since he considers probing only possible under especial circumstances, in extreme atrophy, lues, etc. The case of lues was thus treated, but all others according to Schaeffer's method of penetrating the lower wall of the sinus from the nasal cavity. Winkler advocates this method warmly, and considers trephining of the sinus wall to be indicated if the

former fails. The use of the air douche according to Hartmann is dangerous, since the "cavity may thus be inflated from the balloon with all kinds of micro-organisms," and since the secretions, which were not completely discharged, may be driven back into the cavity (!?).

MÜLLER.

129. HARTMANN introduces the discussion of the anatomical relations by the history of a patient operated by him. The diagnosis of empyema of the frontal sinus could only be made by exploratory irrigation. In order to produce free communication between frontal and nasal cavity, the frontal sinus was chiselled open from in front, the ductus naso-frontalis enlarged with the chisel, and the anterior end of the middle turbinated body removed by the conchotome. Hartmann believes to be justified in considering the entire absence of the naso-frontal canal as the fundamental type for the frontal sinus, which thus extends to the anterior end of the middle turbinated body, and enters freely through a wide fissure into the external portion of the middle nasal meatus. The portion situated below the nasal root is there narrowed by the ethmoid cells, which may advance from all the walls or develop upon them. The cells leave a space free in the centre, which may be designated as naso-frontal duct. This duct enters, as a rule, the anterior sulcus of the infundibulum, in some cases behind it the outer portion of the middle nasal meatus. Probes curved correspondingly readily enter the frontal sinus, if the access from the middle nasal is free. If the cells projecting from the different walls of the lower portion of the frontal sinus, which form the naso-frontal duct, are unequally developed, the naso-frontal canal is pushed off its direction in various ways. On account of his specimens, Hartmann, in accordance with Hausberg, believes that probing of the frontal sinus is feasible in well-nigh one half of all cases.

130. According to CHOLEWA's views the upper end of the hiatus semilunaris leads through an opening (ostium frontale) into the greatly dilated *most anterior* ethmoidal cell, which is said to represent normally the frontal sinus. In addition an especial *fronto-squamous space* is said to exist, into which a narrow, long duct leads. Probing of these ducts is impracticable in the living; on the other hand, probing of the frontal sinus is easy, if it enters the hiatus as the *most anterior* ethmoidal cell; one must, however, understand how to curve and introduce the probe correctly.

KILLIAN.

131. An osteoma of unusual size had in a young man, aged twenty-six, developed in the course of nine years, and had led to considerable deformity. The removal (with the chisel) offered great difficulties: the tumor, springing from the septum, of ivory hardness and lobated, sent forth processes into the left cavity, nose, and orbita; in addition it, had perforated the strongly projecting wall anteriorly and posteriorly at several places. During the removal of the tumor an adherent portion of the posterior plate of the size of a 10-cent piece was also removed, thereby injuring the dura mater. The course of healing was undisturbed, the wound being closed on the seventh day by secondary sutures. The tumor weighed about eighty grammes. The author then discusses genesis, clinical course, diagnosis, and treatment. In comparatively young individuals with steadily growing osteoma, radical operation should be performed as early as possible, even if it is complicated with inflammatory processes; on the other hand, in older people and in standstill of development the treatment may be palliative or eventually consist in enucleation of the eyeball.

MÜLLER.

132. The tumor of the patient, aged twenty, occluded the right nostril, and was associated with marked exophthalmus. Thick and yellowish fluid was discharged through punctures. The tumor contained a large cavity, lined with thin mucous membrane. The very thin osseous walls were removed piecemeal. STRAZZA mentions in addition a case of complete membranous occlusion (congenital?) of the naso-pharyngeal cavity.

GRADENIGO.

133. SCHAEFFER adds to his former publications on the same subject, nineteen acute and fifty-three chronic cases of diseases of the sphenoid cavity, which he observed in the brief period of two years. The patients complained mostly of pains in the occiput and in the centre of the head, and some also of vertigo and pressure behind the eyes. Schaeffer recommends as method of operation, after precedent cocaineization, the penetration with a straight probe at a level with the middle turbinated bone either through the anatomical orifice or through the thin osseous wall. In some cases the opening should be bluntly enlarged downward in order to facilitate the escape of discharges, irrigations with disinfecting fluids, and inflations with crystallized iodol.

NOLTENIUS.

134. The excellent paper of POTIQUET on thickenings of the nasal septum contains an elaborate description of the embryologi-

cal relations upon which Potiquet bases his conclusions. We regret that we have to limit ourselves to drawing the reader's attention to the paper.

135. STRAZZA was less successful with electrolysis in deviations of the nasal system than Moure. The action is slow and painful, but the subsequent reaction is slight. GRADENIGO.

136. DIONISIO gives a full description of the anatomical and clinical relations of the deviations of the nasal septum, describes the different methods of operation, and recommends a pair of scissors for the removal of the thickened and deviated portion of the septum. The strong blades are bent at an angle and cut at the end only. GRADENIGO.

137. After epitomizing the functions of the nose as a part of the respiratory tract, WATSON proceeds to inquire what modifications or interruptions are brought about by stenosis, whether the latter be temporary or permanent, partial or complete, and cases are cited to elucidate the various points. Reference is then made to the various complications, such as asthma, hay fever, snuffles of infants, stenosis connected with adenoid vegetations, syphilis, malformations and distortions of the septum, etc. With regard to treatment Watson is apparently of the opinion that one should rather err on the side of doing too much, than too little, that any operations undertaken for the relief of the stenosis should be thorough and effective, and that our failures are sometimes due to the frequent repetition of partial and incomplete operations. The paper concludes with the contention "that intranasal obstruction is often an important element in the class of cases referred to; that it is often overlooked, or, if found, despised or made light of; and that it should certainly be sought for and dealt with by local treatment in a very large class of diseases in which up to quite recently the influence has been more or less ignored." With these contentions we shall probably be all inclined to agree.

138. Exact anatomical description of atresia nasi.

139. In the patient, an intelligent boy, aged eleven, affected with congenital, bilateral osseous occlusion of the posterior nares, the pharyngeal openings of the tubes and the hearing were normal. The elaborate and interesting account of the condition is recommended to the reader for perusal. SIEBENMANN.

140. A robust peasant, aged nineteen, suffered since his childhood from stenosis of the right nostril through total occlusion of the right choana, which was osseous in the upper, membranous

in the lower half. The operation consisted in perforation of the upper portion by means of a pointed burner and subsequent enlargement with an ordinary forceps, both procedures were made in narcosis. On the following days moderate pain, on the fifth high fever, on the sixth delirium, loss of consciousness, on the following day exitus letalis. An autopsy was not permitted. The author believes that thrombosis of the sinus had taken place, probably due to abnormal course of the vessels.

NOLTENIUS.

141. An account of ten clinical operations of typical fibromata of the naso-pharyngeal cavity performed at de Rossi's clinic, FERRERI does not believe extensive interferences to be justifiable, which are dangerous on account of hemorrhage, deform the face, and do not prevent relapses. The surgeon ought to limit his treatment to electrolysis, which brings most efficiently the patient to an immune age (of from twenty to thirty years).

GRADENIGO.

142. POLI reports the clinical observation and autopsy of a case of polypus in the naso-pharynx. The polypus was situated upon the right half of the pharyngeal roof, the posterior end of the septum, the posterior extremities of the middle and upper turbinated bodies, upon the anterior surface of the sphenoid body, and the posterior end of the lamina cribrosa of the ethmoid bone.

GRADENIGO.

143. The special features of the case consist in the sudden onset, the calculus probably having originated in the submaxillary gland. Two years after the beginning of the disturbance the calculus was removed. It weighed twenty-one grains, measured an inch in length, an inch in circumference at the larger, and three eighths of an inch at the smaller extremity; it resembled a date-seed, and consisted of carbonate and phosphate of lime.

MAX TOEPLITZ.

144. In a case of destruction of the velum palati with antero-posterior cicatricial band crossing the fauces, cicatrization of the lateral pillars, more particularly of the right and bilateral otorrhœa, THORINGTON devised an artificial velum of soft rubber which was attached by a gold band to an artificial plate of vulcanized rubber, and fitted to the roof of the mouth. The velum was furnished with a "heel," which fitted into the naso-pharyngeal space when acted upon by the still remaining muscular power of the pillars. Speech and hearing power were greatly improved.

MAX TOEPLITZ.

145. ROBINSON reports three cases of membranous sore throat

with false membrane, which could not well be placed, and in two of which streptococci were found without Loeffler's bacilli. If the microscope and the cultures of such cases discover cocci, the patient may either succumb or recover according to the intensity of the march of the disease. If the methods reveal the true bacillus of diphtheria, the cases present also either favorable or fatal termination, but admittedly with larger percentage of deaths in the latter form. This would not make much difference as regards remedial treatment, but it gives more confidence to the physician, and improves the prophylaxis to others, which is more rigid in cases where Loeffler's bacillus is found. Robinson does not believe in sulphur fumigations; he is greatly disappointed in bichloride of mercury, but he strongly advocates the use of cubebs in dry form for local treatment. MAX TOEPLITZ.

146. KNIGHT gives in this paper, which contains the introductory remarks for a discussion on the subject of the mycosis, the literature, describes the affection, and mentions the occurrence of the different forms of thread bacilli, as, *e. g.*, *leptothrix diffusa* and *fasciculatus*, and *aspergillus*. Although he does not express an opinion as to their causative relation to the affection, still he prefers to distinguish the cases with excessive growth and constant recurrence as typical cases of mycosis. He recommends galvano-cautery for treatment. The discussion brought out the fact that, apart from local applications, systemic or stomachic treatment was generally recommended. MAX TOEPLITZ.

147. KLINEDINST's patient, male, *æt.* seventeen years, six months, exhibited, apart from bilateral interstitial keratitis and capsular adhesion resulting from iritis, destruction of hard and soft palates, uvula, and part of palatine arches. From upper-posterior portion of posterior pharyngeal wall a movable soft growth hung down to about one half inch below, where the normal line of the left palatine arches would exist, completely occluding the left half of naso-pharynx, and extending to septum, which was easily penetrated by galvano-cautery. Slight deafness and tinnitus, due to pressure of growth and to mucus, was present. A band-like soft growth, not prominent, extending from roof of pharynx down to larynx on the right side, gradually decreased in thickness. Both swellings yielded to treatment.

MAX TOEPLITZ.

148. INGALS' patient, male, *æt.* fifty-nine, presented an enlargement of right tonsil, 4 *cm* in diameter, with thickening of

anterior pillar and uvula. After removal of the sarcomatous tumor by means of steel wire *écraseur*, the remaining ulceration healed upon applications of a 60 per cent. solution of lactic acid. Thickening back of posterior pillar increased, and the cancer progressed to base of the tongue, side of the pharynx, right side of the larynx, causing dysphagia and pain. Injections of 8-10 minims of a solution of from 25 to 50 per cent. of lactid into one or two places three times a week diminished the indurations, relieved the distressing symptoms, thus keeping the disease in check for ten months. The treatment is not curative, but the growth may thus be retarded for a long period.

MAX TOEPLITZ.

149. HALSTED has examined 286 children of from five to fifteen years of age, among whom were 114 feeble-minded ones and 154 from an orphan asylum. The total number of children affected with adenoids 63 (23.7 per cent.). The affection was not more prevalent among the feeble-minded children than among the orphans. Posterior rhinoscopy could be performed in eighty-five per cent. Halsted operated with Jurasz's modification of Loewenberg's forceps.

MAX TOEPLITZ.

150. The disease resembles somewhat a syphiloderm. The female patient was treated for six years on account of fibroma uteri with iodides and mercurials. An ulcer appeared two years ago upon the right tonsil and a small one upon the inside of the left cheek, spread six months ago to the upper lip, which became swollen, and extended to the lower lip. The differential diagnosis between tuberculosis, syphilis, and epithelioma was difficult. The piece of extirpated skin, upon microscopical and bacteriological examination, was found to be tuberculous.

MAX TOEPLITZ.

151. KOPLIK examined a large number of non-typical cases without or with membrane; made cultures from the material taken from the tonsils and inoculations of guinea-pigs to test their virulence. He found the streptococcus in the majority of cases even with Loeffler's bacillus, and he investigated also the relation of the latter to Hofmann's pseudobacillus, which he does not find side by side with Loeffler's bacillus. His inoculations with attenuated cultures for the production of immunity had a negative result. Koplik arrived at the following conclusions. *a*, The forms of diphtheria, which appear clinically without membrane, present the Loeffler-Klebs bacillus and are infective. *b*, Some cases of diphtheria without characteristic local manifestations

closely resemble angina. *c*, It is impossible to sift non-characteristic true diphtheria clinically by mere inspection from non-characteristic angina. *d*, The true diagnosis lies in bacteriology.

MAX TOEPLITZ.

152. SCHEPPEGRELL analyzes fifteen consecutive cases of the affection, of which five occurred in males and ten in females, the ages ranging from 19 to 51 years, but most frequently between 19 and 30. Fourteen cases were observed in whites, one in a mulatto, and none in blacks.

MAX TOEPLITZ.

153. DAWBARN's method consists in surrounding the bleeding surface with a strong purse-string ligature by means of a large semicircular needle, applying the stitches continuously so as to bury the loops in the tissues. The two transverse strokes of the needle may penetrate to about a quarter of an inch; the two vertical ones, running along the pillars, may pass more deeply. The thread may be removed in from twenty-four to thirty-six hours.

MAX TOEPLITZ.

154. KITCHEN removes hypertrophied tonsils with Mackenzie's tonsillotome. He even claims to abort attacks of quinsy by performing tonsillotomy in the beginning of the attack, in contradiction to the prevalent views.

MAX TOEPLITZ.

155. NEWCOMB's patient, a colored man, *æt.* thirty-one, revealed, about three months after the initial lesions, those appearances at the base of the tongue on either side of the median line, which had been best described by Moure and Raulin as ulcerations of nipple-shaped protuberances. The inside of the cheek and the anterior surface of the tongue were, in addition, studded with mucous patches. Newcombe fully enters into the anatomy, physiology, and pathology of the lingual tonsil in general as well as into the pathology of its syphilitic lesions and their differential diagnosis and treatment.

MAX TOEPLITZ.

156. The vomiting had persisted for two weeks in a singer, *æt.* twenty-one, and was instantly relieved by amputation of the uvula. The singing was also materially improved by the operation.

MAX TOEPLITZ.

157. Exact description of a haired pharyngeal polypus in a robust laborer aged twenty-six, which, inserted by means of a thin pedicle upon the anterior pharyngeal wall, consisted principally of fat, was supplied with blood-vessels and nerves, contained nuclei of cartilaginous and several lymph follicles, and was covered by outer integument and its appended structures. The tumor was removed with the cold snare.

NOLTENIUS.

REPORT ON THE FIRST MEETING OF THE SECTION ON OTOLOGY OF THE PAN-AMERICAN MEDICAL CONGRESS, HELD SEPTEMBER 5TH, 6TH, AND 7TH, AT "THE ARLINGTON," WASHINGTON, D. C.

Dr. C. M. HOBBY, of Iowa City, Ia., Presided. Dr. MAX THORNER, of Cincinnati, was Secretary.

In his opening address the President, referring to the presence of Professor Politzer, of Vienna, said: "Meanwhile we have assurance of the kindly help of our fellows from the denser populations of Europe; and I congratulate you upon the presence with us of one whom we all reverence as a master, for whether we have been pupils at Vienna, or have through literature gleaned the steps by which Otology has advanced since the days of Toynbee, there is not one of us but who acknowledges a debt of gratitude for the landmarks established by Professor ADAM POLITZER; and I think I voice the universal sentiment of felicitation that this genius is still active, and that he is here to speak for himself."

The formal address of the President was entitled: *The prevention of deaf-mutism*. He said that the assumption that fifty per cent. of the mutes are congenitally so, is not in accordance with facts, at least for the United States, as it is readily shown that not more than fourteen per cent., and probably only ten per cent., are born deaf. Also middle-ear disease plays only a small part in the production of mutism. The principal cause of deafness resulting in deaf-mutism is to be sought in the various forms of meningitis occurring in the early months of life, cerebro-spinal fever being a predominant factor in the United States. Prevention must come then principally from associated study of clinical history and pathology. Great difficulties arise in recognizing disturbance of hearing in infants, and in the fact that the ear lesion frequently follows

the acute disease without external manifestations, and after a considerable interval of time. Especially should the practitioners of the country be warned of the frequency with which deafness follows apparently slight ailments of children, and they should be impressed with the fact that destruction of hearing most frequently takes place without symptoms referable to the ear.

Dr. J. A. MALONEY read a paper on : *Otacoustic treatment ; its history and results upon the deaf and deaf-mutes*, demonstrating an instrument, called by him the otophone. This and the preceding paper were discussed by Drs. J. M. Bleyer, S. S. Bishop, H. B. Young, Prof. A. Politzer, and Dr. Moloney.

Professor POLITZER followed with a demonstration of a magnificent collection of anatomical and pathological specimens of the ear, exhibiting also a number of new or improved instruments for aural therapeutics.

Dr. M. THORNER read a paper on : *Pathological conditions following piercing of the lobules of the ear*. He criticised the reprehensible practice of piercing the lobes as a relic of barbarism, and related a number of cases where more or less severe sequelæ (as erysipelas, eczema, cleft lobule, fibroma, and keloids) had been observed after this procedure. Discussion by Professor Politzer and Dr. C. R. Holmes.

Prof. A. POLITZER gave an address upon : *A peculiar affection of the labyrinthine capsule as a frequent cause of deafness*. This most interesting and instructive lecture was elucidated by numerous drawings and microscopic specimens. (This paper will be published in full in these ARCHIVES.)

Dr. FELIX COHN followed with a paper : *On the application of Stacke's method in chronic aural catarrh*.

Dr. L. D. BROSE read a paper on *Opening the mastoid cells in acute inflammatory middle-ear disease*.

Dr. ALBERT H. TUTTLE followed with a paper entitled : *Chronic disease of the middle ear—its prognosis and surgical treatment*. He reviewed the different operations recommended of late, and was in favor of removal of the stapes in the dry form of aural catarrh. In suppurating otitis media the removal of the larger ossicles was recommended, while continued suppuration after removal of the ossicles and treatment of the middle ear required special (mastoid) operation.

Dr. S. S. BISHOP, in a paper on *The indications and preferable methods for mastoid operations*, expressed the belief that the ma-

jority of surgeons are too conservative both as to the time selected for surgical interference and the extent of the operation. He formulated six rules, by which he has been guided when to operate, and spoke in favor of Schwartz's method, modified according to the exigencies of each case.

The discussion on the preceding four papers was opened by Dr. C. R. HOLMES, who disfavored the operation of the removal of the stapes. In operating for suppurative processes in the attic or antrum many were too timid. We should use the utmost care to guard against opening into dangerous parts, but we should be bold enough to remove all the diseased tissue.

Professor POLITZER said that he never opens the antrum in acute cases. After opening the mastoid and scraping away all diseased bone, he tampons the wound with iodoform-gauze for one or two days. Of late he has closed the wound immediately after the operation, and the patients have left the hospital within a week. In chronic sclerotic middle-ear disease the extraction of the ossicles is, in his opinion, not likely to be followed by permanently good results.

Dr. JOHNSON ELIOT contributed a paper on *The phonograph in the treatment of deafness*. In his experience the phonograph has proved a failure in the treatment of deafness.

Dr. MAX TOEPLITZ presented a paper: *Clinical contributions to the study of aural syphilis*. He reported a case in which the labyrinth was affected primarily in the course of a freshly acquired case of syphilis. The aural affection began simultaneously with the appearance of roseola.

Dr. LAWRENCE TURNBULL read an elaborate paper on *The present condition of otology in Europe*. In the second part of this paper he referred at length to the operation of excision of the ossicles in chronic suppurative, or non-suppurative (progressive sclerosis or proliferous) disease of the middle ear, and expressed himself in favor of these operations, supporting his views by the report of a number of cases. The discussion which followed was participated in by Drs. Thorner, Maloney, Hobby, Berman, and the essayist.

Dr. DEAN exhibited a set of instruments for the application of the galvanic current to the orifice of the Eustachian tube.

Dr. M. D. LEDERMAN presented a paper on *Adenoids, a contributive factor in aural affections*. He advocates to examine the post-nasal space in all cases of chronic purulent otitis media in children.

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In many cases we will find masses of lymphoid tissue, which must be removed to get good results. Thus we benefit not only the aural complication, but materially influence the general system as well. This paper was discussed by Dr. Fitzpatrick.

Dr. E. D. SPEAR contributed a description of a *Focussing ear trumpet* and had two instruments, a stationary and a portable one, on exhibition.

Dr. R. D. BARRETT demonstrated a new middle-ear powder blower.

Dr. B. ALEX. RANDALL presented a paper on *Craniometric measurements of five hundred skulls in relation to aural topographic anatomy*, in which he came to the conclusion that the cranial index gives little pointing as to the anatomical relations likely to be met by the operator; and it proves that maximal or minimal dimensions may be encountered in any type of skull.

At the beginning of the last session Prof. ADAM POLITZER was unanimously elected HONORARY PRESIDENT of the Section on Otology of the First Pan-American Medical Congress.

Book Reviews.

I.—Text-book on Otology for the Student and Practitioner. By Dr. KURD BÜRKNER, Extraordinary Professor of Medicine and Director of the Aural Policlinic of the University at Goettingen. With 136 wood-cuts from original drawings of the author. Stuttgart: Ferdinand Enke, 1892. x and 368 pages. Price, \$2.25. Reviewed by E. BLOCH, Breslau; translated by DR. MAX TOEPLITZ, New York.

Bürkner's text-book does not fill an urgent want, as is emphasized in the introduction by the author, but it will soon become a favorite with those who desire to be instructed in the present state of otology. The author occasionally adds a concise description of Prussak's space or of the attic (pages 218, 219), or he describes the plexus tympanicus, but, as a rule, he leaves the study of all physiological and anatomical details to the reader's pleasure.

This arrangement has the great advantage of treating the subjects comprehensively, yet leaving much space for the discussion of *clinical* conditions. The author has perfectly succeeded, as may be inferred from a brief review of the contents of the work, in carrying out his purpose of writing an essentially clinical text-book.

The first and general part contains an exact and clear description of the methods of examination. Otoscopy, examination of hearing, examination through the Eustachian tube, and rhinoscopy are treated of, and in the special part the electrical examination also. Bürkner recommends, after his experience of several years, Auer's¹ incandescent gas light as artificial source of light. It deserves the author's praise, especially after its latest improvements. Rhino-

¹ It is called Welsbach's incandescent gas light in this country.—M. T.

scopy is treated somewhat too briefly considering its importance in otology. On the other hand, the description of the methods of treatment, used in general, justly embraces much space. Syringing, introduction of drugs, injections through the Eustachian tube are described in such a manner as to give evidence of the practical experience of the physician and the academical teacher. The general part concludes with a brief chapter on the statistics of aural diseases.

The special part begins with the diseases of the auricle. Defects and excess of development of the auricle, its injuries, among which the othæmatoma is classed, the inflammations in their different etiological and clinical aspects, congelations and combustions separated from each other—are all described with sufficient exactness and in a concise form, as well as the new-formations.

The external meatus is fully considered in the increase of secretions and their treatment, and also in its inflammations with all their different forms. The new-formations and the foreign bodies are fully described according to the aim of the book. The part treating of the affections of the membrana tympani excels in the illustrations. Although the woodcuts cannot be compared with the colored pictures of the membrana tympani, as *e. g.*, in the author's atlas, the drawings, nevertheless, are sharp and characteristic. After the diseases of the tubes, those of the tympanic cavity, the most frequent of the ear, are discussed in corresponding detail. The author follows, for practical reasons, the usual division into acute and chronic catarrh and the same inflammations, and makes exact and reliable statements upon statistics, etiology, pathological anatomy (bacteriology), symptomatology, prognosis, course, and treatment. By the division of the subject-matter carried out strictly according to the above-mentioned principles, the single chapters are not unduly lengthened, and all essential points are given in a clear and concise form. The artificial drum membrane ought to be rather tried several weeks after the entire cessation of the discharge, "when no more noteworthy suppuration is present." Among the new formations of the ear the polypi justly occupy the largest space. Periostitis and otitis of the mastoid process, and the operative opening of the latter, conclude this part of the book, together with a description of caries and necrosis of the temporal bone.

The diseases of the inner ear begin with the confession "that

our diagnoses of diseases of the sound-perceiving organs are only probable ones." The author, in spite of this somewhat depressing assertion, encourages the reader by the statement of so many positive facts in this difficult province, as to make it almost appear as an exaggerated modesty. From the valuable examinations of deafness of railroad employees and of persons in similar vocations, up to the latest microscopico-bacteriological investigations, many hopeful starting-points for a rational pathology of the inner ear are prepared. Bürkner devotes especial chapters to necrosis of the labyrinth, Ménière's complex of symptoms, diseases of the auditory nerve, new formations of the inner ear, subjective sensations of hearing, and deaf-mutism. He might have used in this place Holger Mygind's work on congenital deafness. After a description of the mostly used mechanical apparatuses of hearing, he appends a brief chapter on the most frequent diseases of the nose and pharynx. Among the symptoms and consequences of adenoid vegetations he might have mentioned, in addition to W. Meyer's "dead pronunciation," the disturbances of speech proper associated with the former.

These and similar exceptions to details do not decrease the value of Bürkner's text-book, which is one of the most useful in our specialty. Its excellent get-up is worthy of the contents.

II.—A Manual of Diseases of the Ear. By G. P. FIELD, M. R. C. S., Aural Surgeon to St. Mary's Hospital, London. Fourth edition. Illustrated with colored plates and wood-cuts. Philadelphia: Lea Brothers & Co., 1893.

This new edition of Mr. Field's valuable and popular text-book has been carefully revised and brought up to date. The octavo volume of 382 pages is handsomely gotten up, reasonably complete, clear, and concise in its descriptions, and can be heartily recommended as a book for the student and practitioner.

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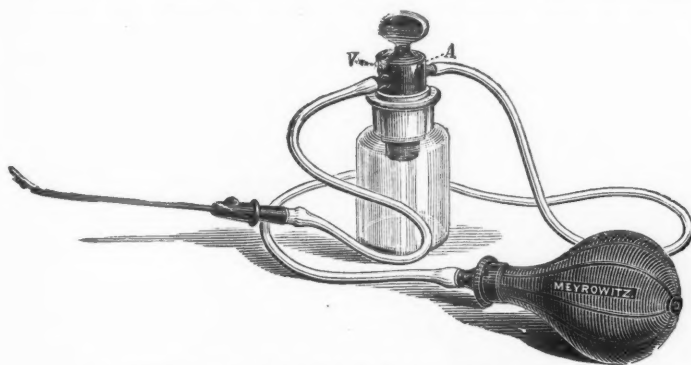
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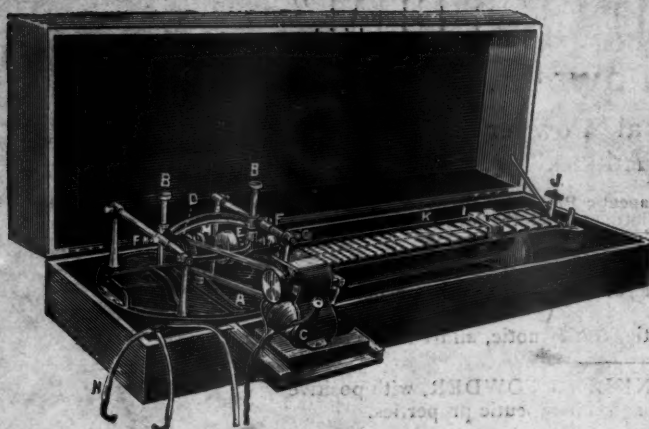
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